 Communications in Theoretical Physics

Commun. Theor. Phys. **75** (2023) 055003 (21pp) https://doi.org/10.1088/1572-9494/acc5de

Optical recursional binormal optical visco Landau–Lifshitz electromagnetic optical density

Talat Körpinar[1,*] **and Zeliha Körpinar**[2]

[1] Muş Alparslan University, Department of Mathematics, 49250, Muş, Turkey
[2] Muş Alparslan University, Department of Administration, 49250, Muş, Turkey

E-mail: talatkorpinar@gmail.com

Received 15 December 2022, revised 20 March 2023
Accepted for publication 21 March 2023
Published 10 May 2023

Abstract

In this manuscript, we study a new version of the optical recursional binormal microbeam model for a flexible binormal microscale beam in terms of a binormal normalized operator. Also, we give new explanations for the optical recursional visco Landau–Lifshitz binormal electromagnetic binormal microscale beam. Finally, we obtain an optical application for the normalized visco Landau–Lifshitz electromagnetic binormal optimistic density with an optical binormal resonator.

Keywords: optical recursion, optical visco Landau–Lifshitz microscale, flexible elastic microscale, electromagnetic optimistic density, visco microbeam model

(Some figures may appear in colour only in the online journal)

1. Introduction

The fundamental design of electromagnetic fibers is constructed by interfacing semiconductors with magnetically density phases by modeling the optical fiber principle. Physical recursion materials have been largely adopted by thin glazes, spherical tubes, cannulas, optical fibers, biopsy needles, fiberscopes, and optical refreshment electrodes with some applications. Progress in physical components, production technology, nanotechnology, and hybrid electronics is compelled by elastic models [1–15].

Numerous applications have drawn on the importance of mathematicians, physicists, and mechanic engineers on electromagnetic hydrodynamic fluid phases. Also, geometric flexible antiferrofluid hybrid microscales are essential hybrid models to collect laser regressions of physical photonic flux paths. Optical ferromagnetic electromagnetic flux density is described by spherical electromotive energy flux applications. Hybrid electromagnetic flux structures have been determined by optical electromagnetic microscales in spherical Heisenberg space, Lorentz geometry, phase geometry, and de Sitter geometry [16–32].

Electrically, propagation of optical geometric microscales is principally required for electromagnetic applications in electrophysical sensors, optical flux devices, and other electromagnetic components. Hybrid geometric influences of optical elastic fibers are conducted in quasi-optical systems, phase modeling, and optical dynamics by viscoelastic optical applications [33–52].

The organisation of our manuscript is as follows. First, we study the optical recursional binormal microbeam model for a flexible binormal microscale beam in terms of a binormal normalized operator. Also, we give new explanations for the optical recursional visco Landau–Lifshitz binormal electromagnetic binormal microscale beam. Finally, we obtain an optical application for normalized visco Landau–Lifshitz electromagnetic binormal optimistic density with an optical binormal resonator.

2. Formulation of recursional operator

Quasi-field equations are

$$\begin{aligned}\nabla_s \boldsymbol{t_q} &= \chi_1 \boldsymbol{n_q} + \chi_2 \boldsymbol{b_q},\\ \nabla_s \boldsymbol{n_q} &= -\chi_1 \boldsymbol{t_q} + \chi_3 \boldsymbol{b_q},\\ \nabla_s \boldsymbol{b_q} &= -\chi_2 \boldsymbol{t_q} - \chi_3 \boldsymbol{n_q},\end{aligned}$$

* Author to whom any correspondence should be addressed.

Also, Lorentz forces are

$$\begin{aligned}
\phi(\boldsymbol{t}_{\mathbf{q}}) &= \psi \boldsymbol{n}_{\boldsymbol{q}} + \chi_2 \boldsymbol{b}_{\boldsymbol{q}},\\
\phi(\boldsymbol{n}_{\mathbf{q}}) &= -\psi \boldsymbol{t}_{\mathbf{q}} + \chi_3 \boldsymbol{b}_{\mathbf{q}},\\
\phi(\boldsymbol{b}_{\mathbf{q}}) &= -\chi_2 \boldsymbol{t}_{\mathbf{q}} - \chi_3 \boldsymbol{n}_{\mathbf{q}},
\end{aligned}$$

where $\psi = \phi(\boldsymbol{t}_{\boldsymbol{q}}) \cdot \boldsymbol{n}_{\boldsymbol{q}}$. Also, electromagnetic fields are

$$\begin{aligned}
\mathcal{B} &= \chi_3 \boldsymbol{t}_{\boldsymbol{q}} - \chi_2 \boldsymbol{n}_{\boldsymbol{q}} + \psi \boldsymbol{b}_{\boldsymbol{q}}\\
\mathcal{E} &= -\frac{\varsigma}{\epsilon}\boldsymbol{t}_{\boldsymbol{q}} + \left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right)\boldsymbol{n}_{\boldsymbol{q}} + \chi_2\left(1 - \frac{\varsigma}{\epsilon}\right)\boldsymbol{b}_{\boldsymbol{q}},
\end{aligned}$$

Putting

$$\frac{\partial \alpha}{\partial t} = \varepsilon_1 \boldsymbol{t}_{\boldsymbol{q}} + \varepsilon_2 \boldsymbol{n}_{\boldsymbol{q}} + \varepsilon_3 \boldsymbol{b}_{\boldsymbol{q}},$$

where ε_1, ε_2, ε_3 are potential velocities.

⋇ *Optical quasi-normalization operators of Lorentz fields are*

$$\begin{aligned}
\mathcal{N}\phi(\boldsymbol{t}_{\boldsymbol{q}}) &= \left(\int_\alpha (\kappa_1^2 + \chi\kappa_2) d\sigma\right)\boldsymbol{t}_{\boldsymbol{q}} + \kappa_1 \boldsymbol{n}_{\mathbf{q}} + \chi \boldsymbol{b}_{\mathbf{q}},\\
\mathcal{N}\phi(\boldsymbol{n}_{\boldsymbol{q}}) &= \left(\int_\alpha \kappa_2\kappa_3 d\sigma\right)\boldsymbol{t}_{\boldsymbol{q}} + \kappa_3 \boldsymbol{b}_{\mathbf{q}},\\
\mathcal{N}\phi(\boldsymbol{b}_{\mathbf{q}}) &= -\left(\int_\alpha \kappa_1\kappa_3 d\sigma\right)\boldsymbol{t}_{\boldsymbol{q}} - \kappa_3 \boldsymbol{n}_{\mathbf{q}},
\end{aligned}$$

and

$$\begin{aligned}
\mathcal{N}\mathcal{B} &= \left(\int_\alpha (-\chi\kappa_1 + \kappa_1\kappa_2) d\sigma\right)\boldsymbol{t}_{\boldsymbol{q}} - \chi \boldsymbol{n}_{\boldsymbol{q}} + \kappa_1 \boldsymbol{b}_{\boldsymbol{q}},\\
\mathcal{N}\mathcal{E} &= \left(\int_\alpha \left(\kappa_1^2\left(1 - \frac{m}{e}\right) + \left(\chi - \frac{m}{e}\kappa_2\right)\kappa_2\right) d\sigma\right)\boldsymbol{t}_{\boldsymbol{q}}\\
&\quad + \kappa_1\left(1 - \frac{m}{e}\right)\boldsymbol{n}_{\boldsymbol{q}} + \left(\chi - \frac{m}{e}\kappa_2\right)\boldsymbol{b}_{\boldsymbol{q}}.
\end{aligned}$$

Also, we get

$$\begin{aligned}
\nabla_s\phi(\boldsymbol{t}_{\boldsymbol{q}}) &= -(\chi_1\psi + \chi_2^2)\boldsymbol{t}_{\boldsymbol{q}} + \left(\frac{\partial}{\partial s}\psi - \chi_2\chi_3\right)\boldsymbol{n}_{\boldsymbol{q}}\\
&\quad + \left(\frac{\partial}{\partial s}\chi_2 + \chi_3\psi\right)\boldsymbol{b}_{\boldsymbol{q}},\\
\nabla_s\phi(\boldsymbol{n}_{\boldsymbol{q}}) &= -\left(\frac{\partial}{\partial s}\psi + \chi_2\chi_3\right)\boldsymbol{t}_{\boldsymbol{q}} - (\psi\chi_1 + \chi_3^2)\boldsymbol{n}_{\boldsymbol{q}}\\
&\quad + \left(\frac{\partial}{\partial s}\chi_3 - \psi\chi_2\right)\boldsymbol{b}_{\boldsymbol{q}},\\
\nabla_s\phi(\boldsymbol{b}_{\boldsymbol{q}}) &= \left(\chi_3\chi_1 - \frac{\partial}{\partial s}\chi_2\right)\boldsymbol{t}_{\boldsymbol{q}} - \left(\frac{\partial}{\partial s}\chi_3 + \chi_2\chi_1\right)\boldsymbol{n}_{\boldsymbol{q}}\\
&\quad - (\chi_2^2 + \chi_3^2)\boldsymbol{b}_{\boldsymbol{q}},
\end{aligned}$$

and

$$\begin{aligned}
\boldsymbol{t}_{\boldsymbol{q}} \times \nabla_s\phi(\boldsymbol{t}_{\boldsymbol{q}}) &= \left(\frac{\partial}{\partial s}\psi - \chi_2\chi_3\right)\boldsymbol{b}_{\boldsymbol{q}} - \left(\frac{\partial}{\partial s}\chi_2 + \chi_3\psi\right)\boldsymbol{n}_{\boldsymbol{q}},\\
\boldsymbol{t}_{\boldsymbol{q}} \times \nabla_s\phi(\boldsymbol{n}_{\boldsymbol{q}}) &= -(\psi\chi_1 + \chi_3^2)\boldsymbol{b}_{\boldsymbol{q}} - \left(\frac{\partial}{\partial s}\chi_3 - \psi\chi_2\right)\boldsymbol{n}_{\boldsymbol{q}},\\
\boldsymbol{t}_{\boldsymbol{q}} \times \nabla_s\phi(\boldsymbol{b}_{\boldsymbol{q}}) &= -\left(\frac{\partial}{\partial s}\chi_3 + \chi_2\chi_1\right)\boldsymbol{b}_{\boldsymbol{q}} + (\chi_2^2 + \chi_3^2)\boldsymbol{n}_{\boldsymbol{q}}.
\end{aligned}$$

⋇ *Optical normalization operators of the above fields are*

$$\mathcal{N}(\boldsymbol{t_q}\times\nabla_s\phi(\boldsymbol{t_q}))=\left(\int_\alpha\left(-\left(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\right)\chi_1+\left(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_2\right)d\sigma\right)\boldsymbol{t_q}-\left(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\right)\boldsymbol{n_q}+\left(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\boldsymbol{b_q},$$

$$\mathcal{N}(\boldsymbol{t_q}\times\nabla_s\phi(\boldsymbol{n_q}))=\left(\int_\alpha\left(-\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\chi_1-(\psi\chi_1+\chi_3^2)\chi_2\right)d\sigma\right)\boldsymbol{t_q}-\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\boldsymbol{n_q}-(\psi\chi_1+\chi_3^2)\boldsymbol{b_q},$$

$$\mathcal{N}(\boldsymbol{t_q}\times\nabla_s\phi(\boldsymbol{b_q}))=\left(\int_\alpha((\chi_2^2+\chi_3^2)\chi_1-\left(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\right)\chi_2\right)d\sigma\right)\boldsymbol{t_q}+(\chi_2^2+\chi_3^2)\boldsymbol{n_q}-\left(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\right)\boldsymbol{b_q}.$$

Then

$$\begin{aligned}\mathcal{R}(\phi(\boldsymbol{t_q}))=&-\left(\int_\alpha\left(-\left(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\right)\chi_1\right.\right.\\&\left.\left.+\left(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_2\right)d\sigma\right)\boldsymbol{t_q}\\&+\left(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\right)\boldsymbol{n_q}-\left(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\boldsymbol{b_q},\\\mathcal{R}(\phi(\boldsymbol{n_q}))=&-\left(\int_\alpha\left(-\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\chi_1\right.\right.\\&-(\psi\chi_1+\chi_3^2)\chi_2)d\sigma)\boldsymbol{t_q}+\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\boldsymbol{n_q}+(\psi\chi_1+\chi_3^2)\boldsymbol{b_q},\\\mathcal{R}(\phi(\boldsymbol{b_q}))=&-\left(\int_\alpha((\chi_2^2+\chi_3^2)\chi_1-\left(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\right)\chi_2\right)d\sigma\right)\boldsymbol{t_q}\\&-(\chi_2^2+\chi_3^2)\boldsymbol{n_q}+\left(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\right)\boldsymbol{b_q}.\end{aligned}$$

For electromagnetic fields, we get

$$\begin{aligned}\nabla_s\mathcal{B}=&\left(-\psi\chi_2+\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\right)\boldsymbol{t_q}\\&+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\boldsymbol{n_q}\\&+\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\boldsymbol{b_q},\\\nabla_s\mathcal{E}=&-\left(\chi_2^2\left(1-\frac{\varsigma}{\epsilon}\right)+\chi_1\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)\right)\boldsymbol{t_q}\\&+\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)-\frac{\varsigma}{\epsilon}\chi_1\right)\boldsymbol{n_q}\\&+\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\boldsymbol{b_q},\end{aligned}$$

and

$$\begin{aligned}\boldsymbol{t_q}\times\nabla_s\mathcal{B}=&\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\boldsymbol{b_q}\\&-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\boldsymbol{n_q},\ \boldsymbol{t_q}\times\nabla_s\mathcal{E}=\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)\right.\\&\left.-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)-\frac{\varsigma}{\epsilon}\chi_1\right)\boldsymbol{b_q}\\&-\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\boldsymbol{n_q}.\end{aligned}$$

⋇ *Optical normalization operators of the above fields are*

$$\mathcal{N}(\boldsymbol{t_q}\times\nabla_s\mathcal{B})=\left(\int_\alpha\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\right)d\sigma\right)\boldsymbol{t_q}$$
$$-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\boldsymbol{n_q}+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\boldsymbol{b_q},\ \mathcal{N}(\boldsymbol{t_q}\times\nabla_s\mathcal{E})=\left(\int_\alpha\left(-\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2\right.\right.\right.$$
$$\left.\left.+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\chi_1+\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)\right.$$
$$\left.\left.-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)-\frac{\varsigma}{\epsilon}\chi_1\right)\chi_2\right)d\sigma\Bigg)\boldsymbol{t_q}-\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2\right.$$
$$\left.+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\boldsymbol{n_q}+\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)\right.$$
$$\left.-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)-\frac{\varsigma}{\epsilon}\chi_1\right)\boldsymbol{b_q}.$$

⋇ *Optical recursional operators of the above electromagnetic fields are*

$$\begin{aligned}\mathcal{R}(\mathcal{B})=&-\left(\int_\alpha\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1\right.\right.\\&\left.\left.+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\right)d\sigma\right)\boldsymbol{t_q}\\&+\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\boldsymbol{n_q}-\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\boldsymbol{b_q},\\ \mathcal{R}(\mathcal{E})=&-\left(\int_\alpha\left(-\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2\right.\right.\right.\\&\left.\left.+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\chi_1+\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)\right.\\&\left.\left.\left.-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)-\frac{\varsigma}{\epsilon}\chi_1\right)\chi_2\right)d\sigma\right)\boldsymbol{t_q}\\&+\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2\right.\\&\left.+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\boldsymbol{n_q}-\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)\right.\\&\left.-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)-\frac{\varsigma}{\epsilon}\chi_1\right)\boldsymbol{b_q}.\end{aligned}$$

3. Recursional visco Landau–Lifshitz electromagnetic $\phi(\boldsymbol{t_q})$ elastic visco microscale beam

⋇ *The optical normalized operator for $\nabla_t\phi(\boldsymbol{t_q})$ is*

$$\begin{aligned}\mathcal{N}\nabla_t\phi(\boldsymbol{t_q})=&\left(\int_\alpha\left(\left(\frac{\partial\psi}{\partial t}-\chi\chi_2\right)\chi_1\right.\right.\\&\left.\left.+\left(\frac{\partial\chi_2}{\partial t}+\chi\psi\right)\chi_2\right)d\sigma\right)\boldsymbol{t_q}\\&+\left(\frac{\partial\psi}{\partial t}-\chi\chi_2\right)\boldsymbol{n_q}+\left(\frac{\partial\chi_2}{\partial t}+\chi\psi\right)\boldsymbol{b_q}.\end{aligned}$$

where $\chi=\nabla_t\boldsymbol{n_q}\cdot\boldsymbol{b_q}$.

⋇ *The optical flexible binormal electroosmotic magnetical $\phi(\boldsymbol{t_q})$ normalized quasi binormal optimistic density is*

$$
\begin{aligned}
{}^{\mathcal{B}}\mathcal{N}\mathcal{D}_{\phi(\boldsymbol{t_q})} = &-\left(\int_\alpha\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\right)d\sigma\right)\times\left(\int_\alpha\left(\left(\frac{\partial\psi}{\partial t}-\chi\chi_2\right)\chi_1\right.\right.\\
&\left.\left.+\left(\frac{\partial\chi_2}{\partial t}+\chi\psi\right)\chi_2\right)d\sigma\right)+\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\left(\frac{\partial\psi}{\partial t}-\chi\chi_2\right)-\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\left(\frac{\partial\chi_2}{\partial t}+\chi\psi\right).
\end{aligned}
$$

⋇ *The optical recursional binormal magnetical $\phi(\boldsymbol{t_q})$ flexible elastic quasi binormal microscale beam is*

$$
\begin{aligned}
{}^{\mathcal{B}}\mathcal{R}\mathcal{M}_{\phi(\boldsymbol{t_q})} = \mathcal{P}_b^{qb}\int\int_{\mathcal{I}}&\left(\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\right.\\
&\times\left(\frac{\partial\psi}{\partial t}-\chi\chi_2\right)\\
&-\left(\int_\alpha\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1\right.\right.\\
&\left.\left.+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\right)d\sigma\right)\\
&\times\left(\int_\alpha\left(\left(\frac{\partial\psi}{\partial t}-\chi\chi_2\right)\chi_1\right.\right.\\
&\left.\left.+\left(\frac{\partial\chi_2}{\partial t}+\chi\psi\right)\chi_2\right)d\sigma\right)\\
&\left.-\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\left(\frac{\partial\chi_2}{\partial t}+\chi\psi\right)\right)d\mathcal{I},
\end{aligned}
$$

where $\mathcal{P}_b^{qb}$ is recursional binormal magnetic flexibility potential.

⋇ *The optical recursional binormal microbeam model for flexible binormal microscale beam is*

$$
\begin{aligned}
&-\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\left(\frac{\partial\chi_2}{\partial t}+\chi\psi\right)-\left(\int_\alpha\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\right)d\sigma\right)\\
&\times\left(\int_\alpha\left(\left(\frac{\partial\psi}{\partial t}-\chi\chi_2\right)\chi_1+\left(\frac{\partial\chi_2}{\partial t}+\chi\psi\right)\chi_2\right)d\sigma\right)+\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\left(\frac{\partial\psi}{\partial t}-\chi\chi_2\right)=0.
\end{aligned}
$$

From the visco Landau–Lifshitz condition, we have

$$
\begin{aligned}
\mathcal{N}(\phi(\boldsymbol{t_q})\times\nabla_s^2\phi(\boldsymbol{t_q})+\nu\nabla_s\phi(\boldsymbol{t_q})) = &\left(\int_\alpha\left(\left(\chi_2\left(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)+\left(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1+\left(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\right)\chi_2\right)+\nu\left(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\right)\chi_1\right.\right.\\
&+\left.\left.\left(\psi\left(\frac{\partial}{\partial s}(\chi_2^2+\chi_1\psi)+\left(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1+\left(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\right)\chi_2\right)+\nu\left(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\right)\right)\chi_2\right)d\sigma\right)\boldsymbol{t_q}+\left(\chi_2\left(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)\right.\right.\\
&+\left.\left.\left(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1+\left(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\right)\chi_2\right)+\nu\left(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\right)\boldsymbol{n_q}+\left(\psi\left(\frac{\partial}{\partial s}(\chi_2^2+\chi_1\psi)+\left(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1\right.\right.\\
&+\left.\left.\left(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\right)\chi_2\right)+\nu\left(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\right)\right)\boldsymbol{b_q}.
\end{aligned}
$$

From the definition of visco Landau–Lifshitz $\phi(\boldsymbol{t_q})$ magnetic binormal optimistic density, we have

$$
\begin{aligned}
{}^{\mathcal{B}}\mathcal{ND}^{*}_{\phi(\boldsymbol{t_q})} &= -\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\chi_1+\Bigg(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
&\times\Bigg(\int_{\alpha}\Bigg(\Bigg(\chi_2\Bigg(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1+\Bigg(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\Bigg)\chi_2\Bigg)\\
&+\nu\Bigg(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\Bigg)\chi_1+\Bigg(\psi\Bigg(\frac{\partial}{\partial s}(\chi_2^2+\chi_1\psi)+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1+\Bigg(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\Bigg)\chi_2\Bigg)\\
&+\nu\Bigg(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\Bigg)\Bigg)\chi_2\Bigg)d\sigma\Bigg)+\Bigg(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\Bigg(\chi_2\Bigg(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)\\
&+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1+\Bigg(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\Bigg)\chi_2\Bigg)+\nu\Bigg(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\Bigg)-\Bigg(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\Bigg)\Bigg(\psi\Bigg(\frac{\partial}{\partial s}(\chi_2^2\\
&+\chi_1\psi)+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1+\Bigg(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\Bigg)\chi_2\Bigg)+\nu\Bigg(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\Bigg)\Bigg).
\end{aligned}
$$

⋇ *The optical recursional visco Landau–Lifshitz binormal magnetical $\phi(\boldsymbol{t_q})$ binormal microscale beam is*

$$
\begin{aligned}
{}^{\mathcal{B}}\mathcal{RM}^{*}_{\phi(\boldsymbol{t_q})} &= \mathcal{P}_b^{qb}\int\int_{\mathcal{I}}\Bigg(\Bigg(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\times\Bigg(\chi_2\Bigg(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1\\
&+\Bigg(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\Bigg)\chi_2\Bigg)+\nu\Bigg(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\Bigg)-\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\chi_1\\
&+\Bigg(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\Bigg)\chi_2\Bigg)d\sigma\Bigg)\times\Bigg(\int_{\alpha}\Bigg(\Bigg(\chi_2\Bigg(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1\\
&+\Bigg(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\Bigg)\chi_2\Bigg)+\nu\Bigg(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\Bigg)\chi_1+\Bigg(\psi\Bigg(\frac{\partial}{\partial s}(\chi_2^2+\chi_1\psi)+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1\\
&+\Bigg(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\Bigg)\chi_2\Bigg)+\nu\Bigg(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\Bigg)\Bigg)\chi_2\Bigg)d\sigma\Bigg)-\Bigg(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\Bigg)\Bigg(\psi\Bigg(\frac{\partial}{\partial s}(\chi_2^2\\
&+\chi_1\psi)+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1+\Bigg(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\Bigg)\chi_2\Bigg)+\nu\Bigg(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\Bigg)\Bigg)\Bigg)d\mathcal{I},
\end{aligned}
$$

where $\mathcal{P}_b^{qb}$ is recursional binormal magnetic flexibility potential.

⋇ *The optical recursional binormal microbeam model for flexible binormal microscale beam is*

$$
\begin{aligned}
&-\Bigg(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\Bigg)\Bigg(\psi\Bigg(\frac{\partial}{\partial s}(\chi_2^2+\chi_1\psi)+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1+\Bigg(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\Bigg)\chi_2\Bigg)\\
&+\nu\Bigg(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\Bigg)\Bigg)-\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\chi_1+\Bigg(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
&\times\Bigg(\int_{\alpha}\Bigg(\Bigg(\chi_2\Bigg(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1+\Bigg(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\Bigg)\chi_2\Bigg)+\nu\Bigg(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\Bigg)\chi_1\\
&+\Bigg(\psi\Bigg(\frac{\partial}{\partial s}(\chi_2^2+\chi_1\psi)+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1+\Bigg(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\Bigg)\chi_2\Bigg)+\nu\Bigg(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\Bigg)\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
&+\Bigg(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\Bigg(\chi_2\Bigg(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)+\Bigg(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Bigg)\chi_1+\Bigg(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\Bigg)\chi_2\Bigg)\\
&+\nu\Bigg(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\Bigg)=0.
\end{aligned}
$$

⋇ *The optical quasi flexible binormal electroosmotic electrical $\phi(\boldsymbol{t_q})$ normalized binormal optimistic density is*

$$
\begin{aligned}
{}^{\mathcal{E}}\mathcal{ND}_{\phi(\boldsymbol{t_q})} = &-\left(\int_\alpha \left(-\left(\chi_3\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \frac{\varsigma}{\epsilon}\chi_2 + \frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\chi_1 + \left(\frac{\partial}{\partial s}\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right) - \frac{\varsigma}{\epsilon}\chi_1\right)\chi_2\right)d\sigma\right)\\
&\times\left(\int_\alpha \left(\left(\frac{\partial\psi}{\partial t} - \chi\chi_2\right)\chi_1 + \left(\frac{\partial\chi_2}{\partial t} + \chi\psi\right)\chi_2\right)d\sigma\right) + \left(\frac{\partial\psi}{\partial t} - \chi\chi_2\right)\left(\chi_3\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \frac{\varsigma}{\epsilon}\chi_2 + \frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\\
&-\left(\frac{\partial}{\partial s}\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right) - \frac{\varsigma}{\epsilon}\chi_1\right) \times \left(\frac{\partial\chi_2}{\partial t} + \chi\psi\right).
\end{aligned}
$$

⋇ *The optical recursional binormal electrical $\phi(\boldsymbol{t_q})$ flexible elastic binormal microscale beam is*

$$
\begin{aligned}
{}^{\mathcal{E}}\mathcal{RM}_{\phi(\boldsymbol{t_q})} = \mathcal{P}_{\varepsilon}^{qb}\int\int_{\mathcal{I}} &\left(\left(\frac{\partial\psi}{\partial t} - \chi\chi_2\right)\left(\chi_3\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \frac{\varsigma}{\epsilon}\chi_2 + \frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\right.\\
&-\left(\int_\alpha \left(-\left(\chi_3\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \frac{\varsigma}{\epsilon}\chi_2 + \frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\chi_1 + \left(\frac{\partial}{\partial s}\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right) - \frac{\varsigma}{\epsilon}\chi_1\right)\chi_2\right)d\sigma\right)\\
&\left.\times\left(\int_\alpha \left(\left(\frac{\partial\psi}{\partial t} - \chi\chi_2\right)\chi_1 + \left(\frac{\partial\chi_2}{\partial t} + \chi\psi\right)\chi_2\right)d\sigma\right) - \left(\frac{\partial}{\partial s}\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right) - \frac{\varsigma}{\epsilon}\chi_1\right) \times \left(\frac{\partial\chi_2}{\partial t} + \chi\psi\right)\right)d\mathcal{I},
\end{aligned}
$$

where $\mathcal{P}_{\varepsilon}^{qb}$ is recursional binormal electric flexibility potential.

⋇ *The optical recursional electric microbeam model for $\phi(\boldsymbol{t_q})$ flexible binormal microscale beam is*

$$
\begin{aligned}
&-\left(\frac{\partial}{\partial s}\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right) - \frac{\varsigma}{\epsilon}\chi_1\right)\left(\frac{\partial\chi_2}{\partial t} + \chi\psi\right) - \left(\int_\alpha \left(-\left(\chi_3\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \frac{\varsigma}{\epsilon}\chi_2\right.\right.\right.\\
&\left.\left.\left.+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\chi_1 + \left(\frac{\partial}{\partial s}\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right) - \frac{\varsigma}{\epsilon}\chi_1\right)\chi_2\right)d\sigma\right)\\
&\times\left(\int_\alpha \left(\left(\frac{\partial\psi}{\partial t} - \chi\chi_2\right)\chi_1 + \left(\frac{\partial\chi_2}{\partial t} + \chi\psi\right)\chi_2\right)d\sigma\right) + \left(\frac{\partial\psi}{\partial t} - \chi\chi_2\right)\left(\chi_3\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \frac{\varsigma}{\epsilon}\chi_2 + \frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right) = 0.
\end{aligned}
$$

⋇ *The normalized visco Landau–Lifshitz $\phi(\boldsymbol{t_q})$ electric binormal optimistic density is*

$$
\begin{aligned}
{}^{\mathcal{E}}\mathcal{ND}^{*}_{\phi(\boldsymbol{t_q})} = &-\left(\int_\alpha \left(-\left(\chi_3\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \frac{\varsigma}{\epsilon}\chi_2 + \frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\chi_1 + \left(\frac{\partial}{\partial s}\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right)\right.\right.\right.\\
&\left.\left.\left.-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right) - \frac{\varsigma}{\epsilon}\chi_1\right)\chi_2\right)d\sigma\right) \times \left(\int_\alpha \left(\left(\chi_2\left(\frac{\partial}{\partial s}(\psi\chi_1 + \chi_2^2) + \left(-\chi_2\chi_3 + \frac{\partial\psi}{\partial s}\right)\chi_1\right.\right.\right.\right.\\
&\left.\left.+\left(\psi\chi_3 + \frac{\partial\chi_2}{\partial s}\right)\chi_2\right) + \nu\left(\frac{\partial}{\partial s}\psi - \chi_2\chi_3\right)\right)\chi_1 + \left(\psi\left(\frac{\partial}{\partial s}(\chi_2^2 + \chi_1\psi) + \left(-\chi_2\chi_3 + \frac{\partial\psi}{\partial s}\right)\chi_1\right.\right.\\
&\left.\left.\left.\left.+\left(\frac{\partial\chi_2}{\partial s} + \psi\chi_3\right)\chi_2\right) + \nu\left(\frac{\partial}{\partial s}\chi_2 + \chi_3\psi\right)\right)\chi_2\right)d\sigma\right) + \left(\chi_3\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \frac{\varsigma}{\epsilon}\chi_2 + \frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\\
&\times\left(\chi_2\left(\frac{\partial}{\partial s}(\psi\chi_1 + \chi_2^2) + \left(-\chi_2\chi_3 + \frac{\partial\psi}{\partial s}\right)\chi_1 + \left(\psi\chi_3 + \frac{\partial\chi_2}{\partial s}\right)\chi_2\right) + \nu\left(\frac{\partial}{\partial s}\psi - \chi_2\chi_3\right)\right)\\
&-\left(\psi\left(\frac{\partial}{\partial s}(\chi_2^2 + \chi_1\psi) + \left(-\chi_2\chi_3 + \frac{\partial\psi}{\partial s}\right)\chi_1 + \left(\frac{\partial\chi_2}{\partial s} + \psi\chi_3\right)\chi_2\right) + \nu\left(\frac{\partial}{\partial s}\chi_2 + \chi_3\psi\right)\right)\\
&\times\left(\frac{\partial}{\partial s}\left(\psi - \frac{\varsigma}{\epsilon}\chi_1\right) - \chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right) - \frac{\varsigma}{\epsilon}\chi_1\right).
\end{aligned}
$$

※ *The optical recursional Landau–Lifshitz binormal electrical $\phi(\boldsymbol{t_q})$ flexible elastic quasi microscale beam is*

$$
\begin{aligned}
{}^{\varepsilon}\mathcal{RM}^{*}_{\phi(\boldsymbol{t_q})} &= \mathcal{P}^{qb}_{\varepsilon}\int\int_{\mathcal{I}}\Bigg(\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\Bigg(\chi_2\Big(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)\\
&+\Big(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Big)\chi_1+\Big(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\Big)\chi_2\Big)+\nu\Big(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Big)\Bigg)\\
&-\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\chi_1+\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
&\times\Bigg(\int_{\alpha}\Bigg(\Bigg(\chi_2\Big(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)+\Big(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Big)\chi_1+\Big(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\Big)\chi_2\Big)+\nu\Big(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Big)\Bigg)\chi_1\\
&+\Bigg(\psi\Big(\frac{\partial}{\partial s}(\chi_2^2+\chi_1\psi)+\Big(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Big)\chi_1+\Big(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\Big)\chi_2\Big)+\nu\Big(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\Big)\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
&-\Bigg(\psi\Big(\frac{\partial}{\partial s}(\chi_2^2+\chi_1\psi)+\Big(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Big)\chi_1+\Big(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\Big)\chi_2\Big)+\nu\Big(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\Big)\Bigg)\\
&\times\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\Bigg)d\mathcal{I},
\end{aligned}
$$

where $\mathcal{P}^{qb}_{\varepsilon}$ is recursional binormal electric flexibility potential.

※ *The optical recursional Landau–Lifshitz binormal electric visco microbeam model for $\phi(\boldsymbol{t_q})$ flexible binormal microscale beam is*

$$
\begin{aligned}
&-\Bigg(\psi\Big(\frac{\partial}{\partial s}(\chi_2^2+\chi_1\psi)+\Big(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Big)\chi_1+\Big(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\Big)\chi_2\Big)+\nu\Big(\frac{\partial}{\partial s}\chi_2\\
&+\chi_3\psi)\Big)\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)-\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\chi_1\\
&+\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\chi_2\Bigg)d\sigma\Bigg)\Bigg(\int_{\alpha}\Bigg(\Bigg(\chi_2\Big(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)\\
&+\Big(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Big)\chi_1+\Big(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\Big)\chi_2\Big)+\nu\Big(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Big)\Bigg)\chi_1+\Bigg(\psi\Big(\frac{\partial}{\partial s}(\chi_2^2+\chi_1\psi)\\
&+\Big(-\chi_2\chi_3+\frac{\partial\psi}{\partial s}\Big)\chi_1+\Big(\frac{\partial\chi_2}{\partial s}+\psi\chi_3\Big)\chi_2\Big)+\nu\Big(\frac{\partial}{\partial s}\chi_2+\chi_3\psi\Big)\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
&+\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\times\Bigg(\chi_2\Big(\frac{\partial}{\partial s}(\psi\chi_1+\chi_2^2)+(-\chi_2\chi_3\\
&+\frac{\partial\psi}{\partial s}\Big)\chi_1+\Big(\psi\chi_3+\frac{\partial\chi_2}{\partial s}\Big)\chi_2\Big)+\nu\Big(\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Big)\Bigg)=0.
\end{aligned}
$$

The optical resonator for the visco Landau–Lifshitz binormal recursional electric $\phi(\boldsymbol{t_q})$ electric binormal optimistic density with a quasi-spherical ring resonator is illustrated in figure 1.

4. Recursional visco Landau–Lifshitz electromagnetical $\phi(\boldsymbol{n_q})$ elastic visco microscale beam

First, we have

$$
\begin{aligned}
\mathcal{N}\nabla_t\phi(\boldsymbol{n_q}) &= \Bigg(\int_{\alpha}\Bigg(-\Bigg(\Big(\Big(-\chi_3\varepsilon_3+\frac{\partial\varepsilon_2}{\partial s}+\chi_1\varepsilon_1\Big)\psi+\chi\chi_3\Bigg)\chi_1+\Bigg(-\Big(\varepsilon_1\chi_2+\frac{\partial\varepsilon_3}{\partial s}+\chi_3\varepsilon_2\Big)\psi+\frac{\partial\chi_3}{\partial t}\Bigg)\chi_2\Bigg)d\sigma\Bigg)\boldsymbol{t_q}\\
&-\Bigg(\Big(-\chi_3\varepsilon_3+\frac{\partial\varepsilon_2}{\partial s}+\chi_1\varepsilon_1\Big)\psi+\chi\chi_3\Bigg)\boldsymbol{n_q}+\Bigg(-\Big(\varepsilon_1\chi_2+\frac{\partial\varepsilon_3}{\partial s}+\chi_3\varepsilon_2\Big)\psi+\frac{\partial\chi_3}{\partial t}\Bigg)\boldsymbol{b_q}.
\end{aligned}
$$

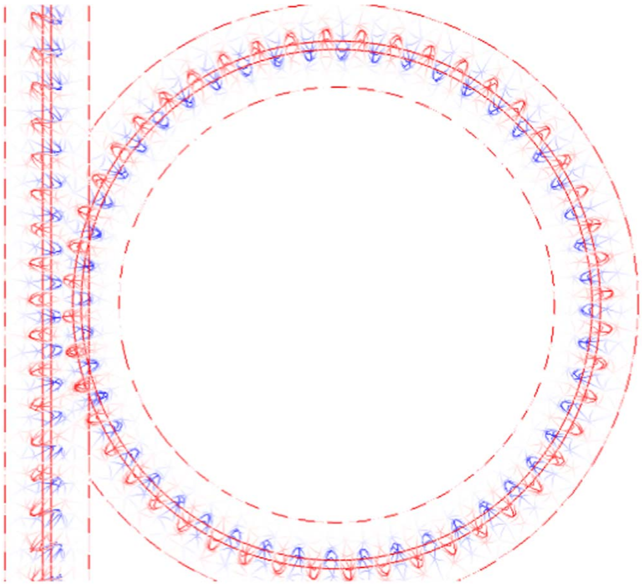

Figure 1. Optical visco Landau–Lifshitz binormal recursional electric $\phi(\boldsymbol{t_q})$ microscale beam.

※ *The optical magnetic normalized binormal $\phi(\boldsymbol{n_q})$ optimistic density is*

$$
\begin{aligned}
{}^{\mathcal{B}}\mathcal{ND}_{\phi(\boldsymbol{n_q})} = &-\Bigg(\int_\alpha \Bigg(-\Big(\chi_3\chi_2 + \frac{\partial}{\partial s}\psi - \chi_2\chi_3\Big)\chi_1 \\
&+\Big(\chi_3\chi_1 - \chi_3\psi - \frac{\partial}{\partial s}\chi_2\Big)\chi_2\Bigg)d\sigma\Bigg) \quad \times\Bigg(\int_\alpha \Bigg(-\Bigg(\Big(-\chi_3\varepsilon_3 + \frac{\partial \varepsilon_2}{\partial s} + \chi_1\varepsilon_1\Big)\psi + \chi\chi_3\Bigg)\chi_1 \\
&+\Bigg(-\Big(\varepsilon_1\chi_2 + \frac{\partial \varepsilon_3}{\partial s} + \chi_3\varepsilon_2\Big)\psi + \frac{\partial \chi_3}{\partial t}\Bigg)\chi_2\Bigg)d\sigma\Bigg) \quad -\Big(\chi_3\chi_2 + \frac{\partial}{\partial s}\psi - \chi_2\chi_3\Big)\Bigg(\Big(-\chi_3\varepsilon_3 + \frac{\partial \varepsilon_2}{\partial s} + \chi_1\varepsilon_1\Big)\psi \\
&+\chi\chi_3) - \Big(\chi_3\chi_1 - \chi_3\psi - \frac{\partial}{\partial s}\chi_2\Big) \quad \times\Bigg(-\Big(\varepsilon_1\chi_2 + \frac{\partial \varepsilon_3}{\partial s} + \chi_3\varepsilon_2\Big)\psi + \frac{\partial \chi_3}{\partial t}\Bigg).
\end{aligned}
$$

※ *The optical recursional binormal magnetical $\phi(\boldsymbol{n_q})$ flexible elastic binormal microscale beam is*

$$
\begin{aligned}
{}^{\mathcal{B}}\mathcal{RM}_{\phi(\boldsymbol{n_q})} = &\mathcal{P}_b^{qb}\int\int_{\mathcal{I}}\Bigg(-\Big(\chi_3\chi_2 + \frac{\partial}{\partial s}\psi - \chi_2\chi_3\Big)\times\Bigg(\Big(-\chi_3\varepsilon_3 + \frac{\partial \varepsilon_2}{\partial s} + \chi_1\varepsilon_1\Big)\psi + \chi\chi_3\Bigg) \\
&-\Bigg(\int_\alpha\Bigg(-\Big(\chi_3\chi_2 + \frac{\partial}{\partial s}\psi - \chi_2\chi_3\Big)\chi_1 + (\chi_3\chi_1 \quad -\chi_3\psi - \frac{\partial}{\partial s}\chi_2\Big)\chi_2\Bigg)d\sigma\Bigg) \\
&\times\Bigg(\int_\alpha\Bigg(-\Bigg(\Big(-\chi_3\varepsilon_3 + \frac{\partial \varepsilon_2}{\partial s} + \chi_1\varepsilon_1\Big)\psi \quad +\chi\chi_3)\chi_1 + \Bigg(-\Big(\varepsilon_1\chi_2 + \frac{\partial \varepsilon_3}{\partial s} + \chi_3\varepsilon_2\Big)\psi + \frac{\partial \chi_3}{\partial t}\Bigg)\chi_2\Bigg)d\sigma\Bigg) \\
&-\Big(-\psi\chi_3 + \chi_3\chi_1 - \frac{\partial}{\partial s}\chi_2\Big)\Bigg(-\Big(\varepsilon_1\chi_2 + \frac{\partial \varepsilon_3}{\partial s} + \chi_3\varepsilon_2\Big)\psi \quad +\frac{\partial \chi_3}{\partial t}\Bigg)\Bigg)d\mathcal{I},
\end{aligned}
$$

where $\mathcal{P}_b^{qb}$ is recursional binormal magnetic flexibility potential.

※ *The optical recursional magnetic binormal microbeam model for* $\phi(\boldsymbol{n_q})$ *flexible binormal microscale beam is*

$$
\begin{aligned}
&-\left(-\psi\chi_3+\chi_3\chi_1-\frac{\partial}{\partial s}\chi_2\right)\left(-\left(\varepsilon_1\chi_2+\frac{\partial\varepsilon_3}{\partial s}+\chi_3\varepsilon_2\right)\psi+\frac{\partial\chi_3}{\partial t}\right)-\left(\int_\alpha\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1\right.\right.\\
&\left.\left.+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\right)d\sigma\right)\times\left(\int_\alpha\left(-\left(\left(-\chi_3\varepsilon_3+\frac{\partial\varepsilon_2}{\partial s}+\chi_1\varepsilon_1\right)\psi+\chi\chi_3\right)\chi_1\right.\right.\\
&\left.\left.+\left(-\left(\varepsilon_1\chi_2+\frac{\partial\varepsilon_3}{\partial s}+\chi_3\varepsilon_2\right)\psi+\frac{\partial\chi_3}{\partial t}\right)\chi_2\right)d\sigma\right)-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\left(\left(-\chi_3\varepsilon_3+\frac{\partial\varepsilon_2}{\partial s}+\chi_1\varepsilon_1\right)\psi\right.\\
&\left.+\chi\chi_3\right)=0.
\end{aligned}
$$

The normalized visco Landau–Lifshitz calculations are

$$
\begin{aligned}
&\mathcal{N}(\phi(\boldsymbol{n_q})\times\nabla_s^2\phi(\boldsymbol{n_q})+\nu\nabla_s\phi(\boldsymbol{n_q}))=\left(\int_\alpha\left(\left(\psi\left(\frac{\partial}{\partial s}\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)-\chi_2(\chi_3\chi_2\right.\right.\right.\right.\\
&\left.+\frac{\partial\psi}{\partial s}\right)-(\chi_3^2+\psi\chi_1)\chi_3\Big)+\chi_3((\chi_1\psi+\chi_3^2)\chi_1\,,-\frac{\partial}{\partial s}\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-\chi_2\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)\Big)\\
&-\nu(\psi\chi_1+\chi_3^2))\chi_1+\left(\psi\left(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)+\left(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1+\left(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\right)\chi_3\right)\right.\\
&\left.\left.+\nu\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\right)\chi_2\Big)d\sigma\Big)\boldsymbol{t_q}+\left(\psi\left(\frac{\partial}{\partial s}\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)-\chi_2\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)\right.\right.\\
&-(\chi_3^2+\psi\chi_1)\chi_3)+\chi_3((\chi_1\psi+\chi_3^2)\chi_1-\frac{\partial}{\partial s}\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-\chi_2\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)\Big)\\
&-\nu(\psi\chi_1+\chi_3^2))\boldsymbol{n_q}+\left(\psi\left(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)+\left(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1+\left(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\right)\chi_3\right)\right.\\
&\left.+\nu\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\right)\boldsymbol{b_q}.
\end{aligned}
$$

The optical visco Landau–Lifshitz normalized $\phi(\boldsymbol{n_q})$ optimistic binormal density is

$$
\begin{aligned}
&\mathcal{ND}^*_{\phi(\boldsymbol{n_q})}=-\left(\int_\alpha\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\right)d\sigma\right)\times\left(\int_\alpha\left(\left(\psi\left(\frac{\partial}{\partial s}\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)\right.\right.\right.\right.\\
&-\chi_2\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-(\chi_3^2+\psi\chi_1)\chi_3)+\chi_3((\chi_1\psi+\chi_3^2)\chi_1\\
&-\frac{\partial}{\partial s}\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-\chi_2\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)\Big)-\nu(\psi\chi_1+\chi_3^2))\chi_1+\left(\psi\left(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)\right.\right.\\
&\left.\left.\left.+\left(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1+\left(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\right)\chi_3\right)+\nu\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\right)\chi_2\right)d\sigma\Big)\\
&+\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\left(\psi\left(\frac{\partial}{\partial s}\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)-\chi_2\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-(\chi_3^2+\psi\chi_1)\chi_3\right)\right.\\
&+\chi_3\left((\chi_1\psi+\chi_3^2)\chi_1-\frac{\partial}{\partial s}\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-\chi_2(-\chi_2\psi+\frac{\partial\chi_3}{\partial s})\right)-\nu(\psi\chi_1+\chi_3^2)\Big)-\left(\psi\left(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)\right.\right.\\
&\left.\left.+\left(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1+\left(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\right)\chi_3\right)+\nu\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\right)\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right).
\end{aligned}
$$

※ *The optical recursional visco Landau–Lifshitz binormal magnetical $\phi(\boldsymbol{n_q})$ binormal microscale beam is*

$$
\begin{aligned}
{}^{\mathcal{B}}\mathcal{RM}^{*}_{\phi(\boldsymbol{t_q})} = \mathcal{P}^{qb}_{b}\int\int_{\mathcal{I}}\Bigg(\bigg(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\bigg)\times\bigg(\psi\bigg(\frac{\partial}{\partial s}\bigg(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\bigg)\\
-\chi_2\bigg(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\bigg)-(\chi_3^2+\psi\chi_1)\chi_3\bigg)+\chi_3\bigg((\chi_1\psi+\chi_3^2)\chi_1-\frac{\partial}{\partial s}\bigg(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\bigg)\\
-\chi_2\bigg(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\bigg)\bigg)-\nu(\psi\chi_1+\chi_3^2)\bigg)-\bigg(\int_{\alpha}\bigg(-\bigg(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\bigg)\chi_1\\
+\bigg(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\bigg)\chi_2\bigg)d\sigma\bigg)\times\bigg(\int_{\alpha}\bigg(\bigg(\psi\bigg(\frac{\partial}{\partial s}\bigg(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\bigg)-\chi_2\bigg(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\bigg)\\
-(\chi_3^2+\psi\chi_1)\chi_3)+\chi_3((\chi_1\psi+\chi_3^2)\chi_1-\frac{\partial}{\partial s}\bigg(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\bigg)-\chi_2\bigg(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\bigg)\bigg)\\
-\nu(\psi\chi_1+\chi_3^2))\chi_1+\bigg(\psi\bigg(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)+\bigg(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\bigg)\chi_1+\bigg(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\bigg)\chi_3\bigg)\\
+\nu\bigg(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\bigg)\bigg)\chi_2\bigg)d\sigma\bigg)-\bigg(\psi\bigg(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)+\bigg(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\bigg)\chi_1+\bigg(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\bigg)\chi_3\bigg)\\
+\nu\bigg(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\bigg)\bigg)\bigg(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\bigg)\Bigg)d\mathcal{I},
\end{aligned}
$$

where $\mathcal{P}^{qb}_{b}$ is recursional binormal magnetic flexibility potential.

※ *The optical recursional ferromagnetic binormal magnetic visco microbeam model for $\phi(\boldsymbol{n_q})$ flexible binormal microscale beam is*

$$
\begin{aligned}
&-\bigg(\psi\bigg(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)+\bigg(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\bigg)\chi_1+\bigg(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\bigg)\chi_3\bigg)+\nu\bigg(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\bigg)\bigg)\\
&\times\bigg(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\bigg)-\bigg(\int_{\alpha}\bigg(-\bigg(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\bigg)\chi_1\\
&+\bigg(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\bigg)\chi_2\bigg)d\sigma\bigg)\times\bigg(\int_{\alpha}\bigg(\bigg(\psi\bigg(\frac{\partial}{\partial s}\bigg(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\bigg)\\
&\quad-\chi_2\bigg(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\bigg)-(\chi_3^2+\psi\chi_1)\chi_3\bigg)+\chi_3\bigg((\chi_1\psi+\chi_3^2)\chi_1-\frac{\partial}{\partial s}\bigg(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\bigg)\\
&-\chi_2\bigg(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\bigg)\bigg)-\nu(\psi\chi_1+\chi_3^2)\bigg)\chi_1+\bigg(\psi\bigg(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)+\bigg(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\bigg)\chi_1\\
&\quad+\bigg(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\bigg)\chi_3\bigg)+\nu\bigg(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\bigg)\bigg)\chi_2\bigg)d\sigma\bigg),+\bigg(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\bigg)\bigg(\psi\bigg(\frac{\partial}{\partial s}\bigg(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\bigg)\\
&\quad-\chi_2\bigg(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\bigg)-(\chi_3^2+\psi\chi_1)\chi_3\bigg)+\chi_3((\chi_1\psi+\chi_3^2)\chi_1-\frac{\partial}{\partial s}\bigg(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\bigg)\\
&\quad-\chi_2\bigg(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\bigg)\bigg)-\nu(\psi\chi_1+\chi_3^2)\bigg)=0.
\end{aligned}
$$

The optical normalized binormal electric optimistic $\phi(\boldsymbol{n_q})$ density is

$$
\begin{aligned}
{}^{\varepsilon}\mathcal{ND}_{\phi(\boldsymbol{n_q})} = &-\Bigg(\int_\alpha\Bigg(-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\Bigg)\chi_1+\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)\\
&-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\chi_2\Bigg)d\sigma\Bigg)\times\Bigg(\int_\alpha\Bigg(-\Bigg(\Bigg(-\chi_3\varepsilon_3+\frac{\partial\varepsilon_2}{\partial s}+\chi_1\varepsilon_1\Bigg)\psi+\chi\chi_3\Bigg)\chi_1\\
&+\Bigg(-\Bigg(\varepsilon_1\chi_2+\frac{\partial\varepsilon_3}{\partial s}+\chi_3\varepsilon_2\Bigg)\psi+\frac{\partial\chi_3}{\partial t}\Bigg)\chi_2\Bigg)d\sigma\Bigg)-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\\
&\times\Bigg(\Bigg(-\chi_3\varepsilon_3+\frac{\partial\varepsilon_2}{\partial s}+\chi_1\varepsilon_1\Bigg)\psi+\chi\chi_3\Bigg)-\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\\
&\times\Bigg(-\Bigg(\varepsilon_1\chi_2+\frac{\partial\varepsilon_3}{\partial s}+\chi_3\varepsilon_2\Bigg)\psi+\frac{\partial\chi_3}{\partial t}\Bigg).
\end{aligned}
$$

⋇ *The optical recursional binormal electrical $\phi(\boldsymbol{n_q})$ flexible elastic binormal microscale beam is given*

$$
\begin{aligned}
{}^{\varepsilon}\mathcal{RM}_{\phi(\boldsymbol{n_q})} = &\,\mathcal{P}_{\varepsilon}^{qb}\int\int_{\mathcal{I}}\Bigg(-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\Bigg)\Bigg(\Bigg(-\chi_3\varepsilon_3+\frac{\partial\varepsilon_2}{\partial s}+\chi_1\varepsilon_1\Bigg)\psi+\chi\chi_3\Bigg)\\
&-\Bigg(\int_\alpha\Bigg(-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\Bigg)\chi_1+\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
&\times\Bigg(\int_\alpha\Bigg(-\Bigg(\Bigg(-\chi_3\varepsilon_3+\frac{\partial\varepsilon_2}{\partial s}+\chi_1\varepsilon_1\Bigg)\psi+\chi\chi_3\Bigg)\chi_1+\Bigg(-\Bigg(\varepsilon_1\chi_2+\frac{\partial\varepsilon_3}{\partial s}+\chi_3\varepsilon_2\Bigg)\psi+\frac{\partial\chi_3}{\partial t}\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
&-\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\times\Bigg(-\Bigg(\varepsilon_1\chi_2+\frac{\partial\varepsilon_3}{\partial s}+\chi_3\varepsilon_2\Bigg)\psi+\frac{\partial\chi_3}{\partial t}\Bigg)\Bigg)d\mathcal{I},
\end{aligned}
$$

where $\mathcal{P}_{\varepsilon}^{qb}$ is recursional binormal electric flexibility potential.

⋇ *The optical visco Landau–Lifshitz recursional binormal electric microbeam model for $\phi(\boldsymbol{n_q})$ flexible binormal microscale beam is*

$$
\begin{aligned}
&-\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\times\Bigg(-\Bigg(\varepsilon_1\chi_2+\frac{\partial\varepsilon_3}{\partial s}+\chi_3\varepsilon_2\Bigg)\psi\\
&+\frac{\partial\chi_3}{\partial t}\Bigg)-\Bigg(\int_\alpha\Bigg(-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\Bigg)\chi_1\\
&+\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\chi_2\Bigg)d\sigma\Bigg)\times\Bigg(\int_\alpha\Bigg(-\Bigg(\Bigg(-\chi_3\varepsilon_3+\frac{\partial\varepsilon_2}{\partial s}+\chi_1\varepsilon_1\Bigg)\psi\\
&+\chi\chi_3)\chi_1+\Bigg(-\Bigg(\varepsilon_1\chi_2+\frac{\partial\varepsilon_3}{\partial s}+\chi_3\varepsilon_2\Bigg)\psi+\frac{\partial\chi_3}{\partial t}\Bigg)\chi_2\Bigg)d\sigma\Bigg)-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\\
&\times\Bigg(\Bigg(-\chi_3\varepsilon_3+\frac{\partial\varepsilon_2}{\partial s}+\chi_1\varepsilon_1\Bigg)\psi+\chi\chi_3\Bigg)=0.
\end{aligned}
$$

The optical visco Landau–Lifshitz normalized electric optimistic density is

$$
\begin{aligned}
{}^{\varepsilon}\mathcal{ND}^{*}_{\phi(\boldsymbol{n_q})} = &-\left(\int_{\alpha}\left(\left(\psi\left(\frac{\partial}{\partial s}\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)-\chi_2\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-(\chi_3^2+\psi\chi_1)\chi_3\right)\right.\right.\right.\\
&+\chi_3\left((\chi_1\psi+\chi_3^2)\chi_1-\frac{\partial}{\partial s}\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-\chi_2\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)\right)-\nu(\psi\chi_1+\chi_3^2)\Bigg)\chi_1\\
&+\left(\psi\left(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)+\left(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1+\left(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\right)\chi_3\right)+\nu\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\right)\chi_2\Bigg)d\sigma\Bigg)\\
&\times\left(\int_{\alpha}\left(-\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\chi_1+\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)-\frac{\varsigma}{\epsilon}\chi_1\right)\chi_2\right)d\sigma\right)\\
&+\left(\psi\left(\frac{\partial}{\partial s}\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)-\chi_2\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-(\chi_3^2+\psi\chi_1)\chi_3\right)+\chi_3((\chi_1\psi+\chi_3^2)\chi_1\right.\\
&-\frac{\partial}{\partial s}\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-\chi_2\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)\Bigg)-\nu(\psi\chi_1+\chi_3^2))\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2\right.\\
&+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\Bigg)-\left(\psi\left(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)+\left(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1\right.\right.\\
&+\left(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\right)\chi_3\Bigg)+\nu\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\Bigg)\times\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)-\frac{\varsigma}{\epsilon}\chi_1\right).
\end{aligned}
$$

⋇ *The optical recursional visco Landau–Lifshitz electrical $\phi(\boldsymbol{n_q})$ flexible elastic binormal microscale beam is presented*

$$
\begin{aligned}
{}^{\varepsilon}\mathcal{RM}^{*}_{\phi(\boldsymbol{n_q})} = \mathcal{P}^{qb}_{\varepsilon}\int\int_{\mathcal{I}}&\left(\left(\psi\left(\frac{\partial}{\partial s}\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)-\chi_2\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-(\chi_3^2+\psi\chi_1)\chi_3\right)\right.\right.\\
&+\chi_3\left((\chi_1\psi+\chi_3^2)\chi_1-\frac{\partial}{\partial s}\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-\chi_2\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)\right)-\nu(\psi\chi_1+\chi_3^2)\Bigg)\\
&\times\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)-\left(\int_{\alpha}\left(\left(\psi\left(\frac{\partial}{\partial s}\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)\right.\right.\right.\right.\\
&-\chi_2\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-(\chi_3^2+\psi\chi_1)\chi_3)+\chi_3((\chi_1\psi+\chi_3^2)\chi_1\\
&-\frac{\partial}{\partial s}\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-\chi_2\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)\Bigg)-\nu(\psi\chi_1+\chi_3^2))\chi_1+\left(\psi\left(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)\right.\right.\\
&+\left(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1+\left(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\right)\chi_3\Bigg)+\nu\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
&\times\left(\int_{\alpha}\left(-\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\chi_1+\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)\right.\right.\right.\\
&-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\chi_2\Bigg)d\sigma\Bigg)-\left(\psi\left(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)+\left(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1\right.\right.\\
&+\left(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\right)\chi_3\Bigg)+\nu\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\Bigg)\times\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\quad-\frac{\varsigma}{\epsilon}\chi_1\right)\Bigg)d\mathcal{I},
\end{aligned}
$$

where $\mathcal{P}^{qb}_{\varepsilon}$ is recursional binormal electric flexibility potential.

⋇ *The optical recursional visco Landau–Lifshitz binormal electric visco microbeam model for $\phi(\boldsymbol{n_q})$ flexible binormal microscale beam is*

$$-\left(\psi\left(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)+\left(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1+\left(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\right)\chi_3\right)+\nu\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\right)$$
$$\times\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)-\frac{\varsigma}{\epsilon}\chi_1\right)-\left(\int_\alpha\left(\left(\psi\left(\frac{\partial}{\partial s}\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)-\chi_2\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)\right.\right.\right.\right.$$
$$-(\chi_3^2+\psi\chi_1)\chi_3)+\chi_3((\chi_1\psi+\chi_3^2)\chi_1-\frac{\partial}{\partial s}\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-\chi_2\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)\bigg)\bigg)$$
$$-\nu(\psi\chi_1+\chi_3^2))\chi_1+\left(\psi\left(\frac{\partial}{\partial s}(\chi_1\psi+\chi_3^2)+\left(\chi_2\chi_3+\frac{\partial\psi}{\partial s}\right)\chi_1+\left(-\psi\chi_2+\frac{\partial\chi_3}{\partial s}\right)\chi_3\right)\right.$$
$$+\nu\left(\frac{\partial}{\partial s}\chi_3-\psi\chi_2\right)\bigg)\chi_2\bigg)d\sigma\bigg)\times\left(\int_\alpha\left(-\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\chi_1\right.\right.$$
$$+\left(\frac{\partial}{\partial s}\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\chi_3\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)-\frac{\varsigma}{\epsilon}\chi_1\right)\chi_2\bigg)d\sigma\bigg)+\left(\psi\left(\frac{\partial}{\partial s}\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)-\chi_2\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)\right.\right.$$
$$-(\chi_3^2+\psi\chi_1)\chi_3)+\chi_3((\chi_1\psi+\chi_3^2)\chi_1-\frac{\partial}{\partial s}\left(\chi_3\chi_2+\frac{\partial\psi}{\partial s}\right)-\chi_2\left(-\chi_2\psi+\frac{\partial\chi_3}{\partial s}\right)\bigg)\bigg)$$
$$-\nu(\psi\chi_1+\chi_3^2))\left(\chi_3\left(\psi-\frac{\varsigma}{\epsilon}\chi_1\right)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\left(1-\frac{\varsigma}{\epsilon}\right)\right)\bigg)=0.$$

The optical resonator for visco Landau–Lifshitz binormal recursional electric $\phi(\boldsymbol{n_q})$ electric binormal optimistic density with quasi spherical ring resonator is illustrated in figure 2.

5. Recursional visco Landau–Lifshitz electromagnetical $\phi(\boldsymbol{b_q})$ elastic visco microscale beam

The normalization operator of $\nabla_t\phi(\boldsymbol{b_q})$ is

$$\mathcal{N}\nabla_t\phi(\boldsymbol{b_q})=\left(\int_\alpha\left(-\left(\chi_2\left(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\right)+\frac{\partial\chi_3}{\partial t}\right)\chi_1-\left(\chi_2\left(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\right)\right.\right.\right.$$
$$+\chi\chi_3)\chi_2)d\sigma)\boldsymbol{t_q}-\left(\chi_2\left(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\right)+\frac{\partial\chi_3}{\partial t}\right)\boldsymbol{n_q}-\left(\chi_2\left(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\right)+\chi\chi_3\right)\boldsymbol{b_q}.$$

⋇ *The optical flexible binormal electroosmotic magnetical $\phi(\boldsymbol{b_q})$ normalized quasi binormal optimistic density is*

$$^{\mathcal{B}}\mathcal{ND}_{\phi(\boldsymbol{b_q})}=-\left(\int_\alpha\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\right)d\sigma\right)$$
$$\times\left(\int_\alpha\left(-\left(\chi_2\left(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\right)+\frac{\partial\chi_3}{\partial t}\right)\chi_1-\left(\chi_2\left(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\right)+\chi\chi_3\right)\chi_2\right)d\sigma\right)-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)$$
$$\times\left(\chi_2\left(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\right)+\frac{\partial\chi_3}{\partial t}\right)+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\times\left(\chi_2\left(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\right)+\chi\chi_3\right).$$

⋇ *The optical recursional binormal magnetical $\phi(\boldsymbol{b_q})$ flexible elastic quasi binormal microscale beam is*

$$^{\mathcal{B}}\mathcal{RM}_{\phi(\boldsymbol{n_q})}=\mathcal{P}_b^{qb}\int\int_{\mathcal{I}}\left(-\left(\frac{\partial\psi}{\partial s}+\chi_3\chi_2-\chi_2\chi_3\right)\times\left(\chi_2\left(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\right)+\frac{\partial\chi_3}{\partial t}\right)\right.$$
$$-\left(\int_\alpha\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\right)d\sigma\right)$$
$$\times\left(\int_\alpha\left(-\left(\chi_2\left(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\right)+\frac{\partial\chi_3}{\partial t}\right)\chi_1-\left(\chi_2\left(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\right)+\chi\chi_3\right)\chi_2\right)d\sigma\right)$$
$$+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\times\left(\chi_2\left(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\right)+\chi\chi_3\right))d\mathcal{I},$$

where $\mathcal{P}_b^{qb}$ is recursional binormal magnetic flexibility potential.

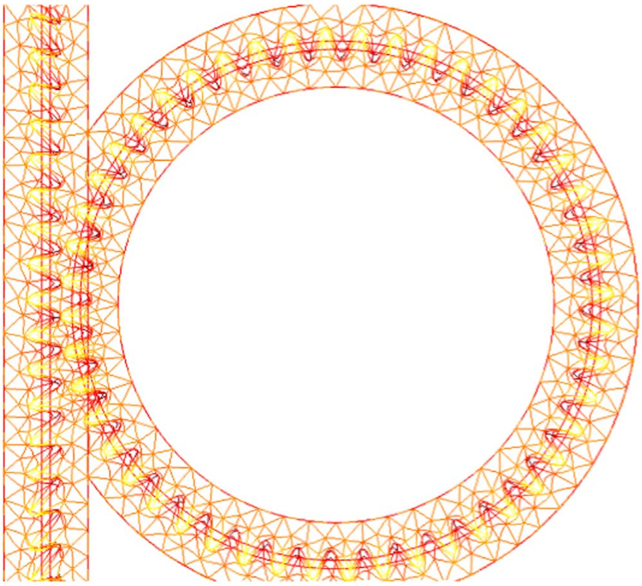

Figure 2. Optical visco Landau–Lifshitz binormal recursional electric ϕ ($\boldsymbol{n_q}$) microscale beam.

⋇ *The optical recursional magnetic microbeam model for* $\phi(\boldsymbol{b_q})$ *flexible binormal microscale beam is*

$$\left(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1-\chi_3\psi\right)\left(\chi_2\left(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\right)+\chi\chi_3\right)-\left(\int_\alpha\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1\right.\right.$$
$$\left.\left.+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\right)d\sigma\right)\times\left(\int_\alpha\left(-\left(\chi_2\left(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\right)+\frac{\partial\chi_3}{\partial t}\right)\chi_1\right.\right.$$
$$\left.\left.-\left(\chi_2\left(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\right)+\chi\chi_3\right)\chi_2\right)d\sigma\right)-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\left(\chi_2\left(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\right)+\frac{\partial\chi_3}{\partial t}\right)=0.$$

The normalized visco Landau–Lifshitz calculations of $\phi(\boldsymbol{b_q})$ are

$$\mathcal{N}(\phi(\boldsymbol{b_q})\times\nabla_s^2\phi(\boldsymbol{b_q})+\nu\nabla_s\phi(\boldsymbol{b_q}))=\left(\int_\alpha\left(\left(\chi_2\left(\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)\chi_2-\chi_3\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)\right.\right.\right.\right.$$
$$\left.\left.-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\right)-\nu\left(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\right)\right)\chi_1+\left(\chi_3\left(\frac{\partial}{\partial s}\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)+\chi_1\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)\right.\right.$$
$$\left.+(\chi_2^2+\chi_3^2)\chi_2\right)-\chi_2\left(\chi_1\left(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\right)+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)\right)$$
$$\left.-\nu(\chi_2^2+\chi_3^2))\chi_2)d\sigma\right)\boldsymbol{t_q}+\left(\chi_2\left(\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)\chi_2-\chi_3\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\right)\right.$$
$$\left.-\nu\left(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\right)\right)\boldsymbol{n_q}+\left(\chi_3\left(\frac{\partial}{\partial s}\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)+\chi_1\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)+(\chi_2^2+\chi_3^2)\chi_2\right)\right.$$
$$\left.-\chi_2\left(\chi_1\left(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\right)+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)\right)-\nu(\chi_2^2+\chi_3^2)\right)\boldsymbol{b_q}.$$

The optical visco Landau–Lifshitz magnetic $\phi(\boldsymbol{b_q})$ binormal optimistic density is

$$
\begin{aligned}
{}^{\mathcal{B}}\mathcal{ND}^{*}_{\phi(\boldsymbol{b_q})} = &-\left(\int_{\alpha}\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\right)d\sigma\right)\\
&\times\left(\int_{\alpha}\left(\left(\chi_2\left(\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)\chi_2-\chi_3\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\right)-\nu\left(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\right)\right)\chi_1\right.\\
&+\left(\chi_3\left(\frac{\partial}{\partial s}\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)+\chi_1\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)+(\chi_2^2+\chi_3^2)\chi_2\right)-\chi_2\left(\chi_1\left(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\right)\right.\right.\\
&+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)\Bigg)-\nu(\chi_2^2+\chi_3^2))\chi_2)d\sigma)+\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\\
&\times\left(\chi_2\left(\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)\chi_2-\chi_3\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\right)\right.\\
&-\nu\left(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\right)\Bigg)-\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\left(\chi_3\left(\frac{\partial}{\partial s}\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)\right.\right.\\
&+\chi_1\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)+(\chi_2^2+\chi_3^2)\chi_2\Bigg)-\chi_2\left(\chi_1\left(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\right)+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)\right)-\nu(\chi_2^2+\chi_3^2)\Bigg).
\end{aligned}
$$

※ *The* optica*l recursional visco Landau–Lifshitz binormal magnetical* $\phi(\boldsymbol{b_q})$*flexible elastic binormal microscale beam* is

$$
\begin{aligned}
{}^{\mathcal{B}}\mathcal{RM}^{*}_{\phi(\boldsymbol{b_q})} = \mathcal{P}_b^{qb}\int\int_{\mathcal{I}}&\left(\left(\chi_2\left(\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)\chi_2-\chi_3\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\right)\right.\right.\\
&-\nu\left(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\right)\Bigg)\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)-\left(\int_{\alpha}\left(-\left(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\right)\chi_1\right.\right.\\
&+\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\chi_2\Bigg)d\sigma\Bigg)\times\left(\int_{\alpha}\left(\left(\chi_2\left(\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)\chi_2\chi_3\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)\right.\right.\right.\right.\\
&-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\Bigg)-\nu\left(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\right)\Bigg)\chi_1+\left(\chi_3\left(\frac{\partial}{\partial s}\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)+\chi_1\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)\right.\right.\\
&+(\chi_2^2+\chi_3^2)\chi_2)-\chi_2\left(\chi_1\left(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\right)+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)\right)\\
&-\nu(\chi_2^2+\chi_3^2))\chi_2)d\sigma)-\left(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\right)\times\left(\chi_3\left(\frac{\partial}{\partial s}\left(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\right)+\chi_1\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)\right.\right.\\
&+(\chi_2^2+\chi_3^2)\chi_2)-\chi_2\left(\chi_1\left(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\right)+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\left(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\right)\right)\\
&-\nu(\chi_2^2+\chi_3^2)))d\mathcal{I},
\end{aligned}
$$

where $\mathcal{P}_b^{qb}$ *is recursional binormal magnetic flexibility potential.*

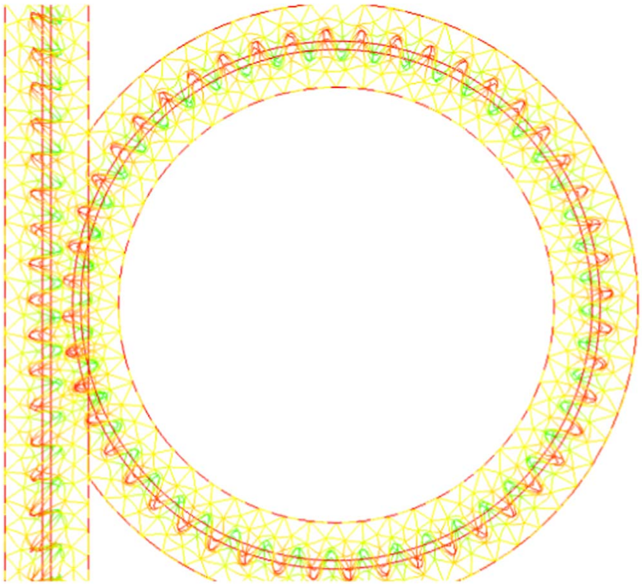

Figure 3. Optical visco Landau–Lifshitz binormal recursional electric $\phi(\boldsymbol{b_q})$ microscale beam.

⋇ *The optical recursional visco Landau–Lifshitz binormal magnetic visco microbeam model for $\phi(\boldsymbol{b_q})$ flexible binormal microscale beam is*

$$
\begin{aligned}
{}^{\mathcal{B}}\mathcal{ND}^{*}_{\phi(\boldsymbol{b_q})} = &-\Bigg(\int_\alpha \Bigg(-\Bigg(\chi_3\chi_2 + \frac{\partial}{\partial s}\psi - \chi_2\chi_3\Bigg)\chi_1 + \Bigg(\chi_3\chi_1 - \chi_3\psi - \frac{\partial}{\partial s}\chi_2\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
&\times\Bigg(\int_\alpha\Bigg(\Bigg(\chi_2\Bigg(\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)\chi_2 - \chi_3\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg) - \frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\Bigg) - \nu\Bigg(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\Bigg)\Bigg)\chi_1\\
&+\Bigg(\chi_3\Bigg(\frac{\partial}{\partial s}\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)+\chi_1\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)\\
&+(\chi_2^2+\chi_3^2)\chi_2) - \chi_2\Bigg(\chi_1\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\Bigg)+\chi_3(\chi_2^2+\chi_3^2) - \frac{\partial}{\partial s}\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)\Bigg)\\
&-\nu(\chi_2^2+\chi_3^2))\chi_2)d\sigma) + \Bigg(\chi_3\chi_2+\frac{\partial}{\partial s}\psi-\chi_2\chi_3\Bigg)\times\Bigg(\chi_2\Bigg(\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)\chi_2\\
&-\chi_3\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\Bigg)-\nu\Bigg(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\Bigg)\Bigg)-\Bigg(\chi_3\chi_1-\chi_3\psi-\frac{\partial}{\partial s}\chi_2\Bigg)\\
&\times\Bigg(\chi_3\Bigg(\frac{\partial}{\partial s}\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)+\chi_1\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)+(\chi_2^2+\chi_3^2)\chi_2)-\chi_2\Bigg(\chi_1\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\Bigg)\\
&+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)\Bigg)-\nu(\chi_2^2+\chi_3^2)\Bigg).
\end{aligned}
$$

The normalized electric binormal optimistic density is

$$
\begin{aligned}
{}^{\varepsilon}\mathcal{ND}_{\phi(\boldsymbol{b_q})} = & -\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\chi_1+\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)\\
& -\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\chi_2\Bigg)d\sigma\Bigg)\times\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_2\Big(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\Big)+\frac{\partial\chi_3}{\partial t}\Bigg)\chi_1\\
& -\Bigg(\chi_2\Big(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\Big)+\chi\chi_3\Bigg)\chi_2\Bigg)d\sigma\Bigg)-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\\
& \times\Bigg(\chi_2\Big(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\Big)+\frac{\partial\chi_3}{\partial t}\Bigg)+\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\\
& \times\Bigg(\chi_2\Big(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\Big)+\chi\chi_3\Bigg).
\end{aligned}
$$

※ *The* optic*al recursional binormal electrical $\phi(\boldsymbol{b_q})$ flexible elastic binormal microscale beam is given*

$$
\begin{aligned}
{}^{\varepsilon}\mathcal{RM}_{\phi(\boldsymbol{b_q})} = & \ \mathcal{P}_{\varepsilon}^{qb}\int\int_{\mathcal{I}}\Bigg(-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\Bigg(\chi_2\Big(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\Big)+\frac{\partial\chi_3}{\partial t}\Bigg)\\
& -\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\chi_1+\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
& \times\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_2\Big(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\Big)+\frac{\partial\chi_3}{\partial t}\Bigg)\chi_1-\Bigg(\chi_2\Big(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\Big)+\chi\chi_3\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
& +\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\times\Bigg(\chi_2\Big(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\Big)+\chi\chi_3\Bigg)\Bigg)d\mathcal{I},
\end{aligned}
$$

where $\mathcal{P}_{\varepsilon}^{qb}$ is recursional binormal electric flexibility potential.

※ *The* optic*al recursional electric microbeam model for $\phi(\boldsymbol{b_q})$ flexible binormal microscale beam is*

$$
\begin{aligned}
& \Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\times\Bigg(\chi_2\Big(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\Big)+\chi\chi_3\Bigg)\\
& -\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\chi_1+\Bigg(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
& \times\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_2\Big(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\Big)+\frac{\partial\chi_3}{\partial t}\Bigg)\chi_1-\Bigg(\chi_2\Big(\chi_2\varepsilon_1+\varepsilon_2\chi_3+\frac{\partial\varepsilon_3}{\partial s}\Big)+\chi\chi_3\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
& -\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)\times\Bigg(\chi_2\Big(\chi_1\varepsilon_1+\frac{\partial\varepsilon_2}{\partial s}-\chi_3\varepsilon_3\Big)+\frac{\partial\chi_3}{\partial t}\Bigg)=0.
\end{aligned}
$$

Since

$$
\begin{aligned}
{}^{\varepsilon}\mathcal{ND}^{*}_{\phi(\boldsymbol{b_q})} = &-\Bigg(\int_{\alpha}\Bigg(\Bigg(\chi_2\Bigg(\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)\chi_2-\chi_3\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\Bigg)\\
&-\nu\Bigg(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\Bigg)\Bigg)\chi_1+\Bigg(\chi_3\Bigg(\frac{\partial}{\partial s}\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)\\
&+\chi_1\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)+(\chi_2^2+\chi_3^2)\chi_2\Bigg)-\chi_2\Bigg(\chi_1\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\Bigg)\\
&+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)\Bigg)-\nu(\chi_2^2+\chi_3^2))\chi_2)d\sigma)\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_3\Bigg(\psi-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\\
&-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Bigg(1-\frac{\varsigma}{\epsilon}\Bigg)\Bigg)\chi_1+\Bigg(\frac{\partial}{\partial s}\Bigg(\psi-\frac{\varsigma}{\epsilon}\chi_1\Bigg)-\chi_3\chi_2\Bigg(1-\frac{\varsigma}{\epsilon}\Bigg)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\chi_2\Bigg)d\sigma\Bigg)\\
&+\Bigg(\chi_2\Bigg(\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)\chi_2-\chi_3\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\Bigg)-\nu\Bigg(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\Bigg)\Bigg)\Bigg(\chi_3\Bigg(\psi-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\\
&-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Bigg(1-\frac{\varsigma}{\epsilon}\Bigg)\Bigg)-\Bigg(\chi_3\Bigg(\frac{\partial}{\partial s}\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)+\chi_1\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)\\
&+(\chi_2^2+\chi_3^2)\chi_2)-\chi_2\Bigg(\chi_1\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\Bigg)+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)\Bigg)\\
&-\nu(\chi_2^2+\chi_3^2))\Bigg(\frac{\partial}{\partial s}\Bigg(\psi-\frac{\varsigma}{\epsilon}\chi_1\Bigg)-\chi_3\chi_2\Bigg(1-\frac{\varsigma}{\epsilon}\Bigg)-\frac{\varsigma}{\epsilon}\chi_1\Bigg).
\end{aligned}
$$

⋇ *The quasi-recursional visco Landau–Lifshitz binormal electrical $\phi(\boldsymbol{b_q})$ binormalmicroscale beam is*

$$
\begin{aligned}
{}^{\varepsilon}\mathcal{RM}^{*}_{\phi(\boldsymbol{b_q})} = &\mathcal{P}^{qb}_{\varepsilon}\int\int_{\mathcal{I}}\Bigg(\Bigg(\chi_2\Bigg(\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)\chi_2-\chi_3\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\Bigg)\\
&-\nu\Bigg(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\Bigg)\Bigg)\Bigg(\chi_3\Bigg(\psi-\frac{\varsigma}{\epsilon}\chi_1\Bigg)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Bigg(1-\frac{\varsigma}{\epsilon}\Bigg)\Bigg)\\
&-\Bigg(\int_{\alpha}\Bigg(\Bigg(\chi_2\Bigg(\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)\chi_2-\chi_3\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\Bigg)\\
&-\nu\Bigg(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\Bigg)\Bigg)\chi_1+\Bigg(\chi_3\Bigg(\frac{\partial}{\partial s}\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)+\chi_1\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)+(\chi_2^2+\chi_3^2)\chi_2\Bigg)\\
&-\chi_2\Bigg(\chi_1\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\Bigg)+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)\Bigg)\\
&-\nu(\chi_2^2+\chi_3^2))\chi_2)d\sigma)\times\Bigg(\int_{\alpha}\Bigg(-\Bigg(\chi_3\Bigg(\psi-\frac{\varsigma}{\epsilon}\chi_1\Bigg)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Bigg(1-\frac{\varsigma}{\epsilon}\Bigg)\Bigg)\chi_1\\
&+\Bigg(\frac{\partial}{\partial s}\Bigg(\psi-\frac{\varsigma}{\epsilon}\chi_1\Bigg)-\chi_3\chi_2\Bigg(1-\frac{\varsigma}{\epsilon}\Bigg)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\chi_2\Bigg)d\sigma\Bigg)-\Bigg(\chi_3\Bigg(\frac{\partial}{\partial s}\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Bigg)+\chi_1\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)\\
&+(\chi_2^2+\chi_3^2)\chi_2)-\chi_2\Bigg(\chi_1\Bigg(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\Bigg)+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\Bigg(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Bigg)\Bigg)-\nu(\chi_2^2+\chi_3^2)\Bigg)\\
&\times\Bigg(\frac{\partial}{\partial s}\Bigg(\psi-\frac{\varsigma}{\epsilon}\chi_1\Bigg)-\chi_3\chi_2\Bigg(1-\frac{\varsigma}{\epsilon}\Bigg)-\frac{\varsigma}{\epsilon}\chi_1\Bigg)\Bigg)d\mathcal{I},
\end{aligned}
$$

where $\mathcal{P}^{qb}_{\varepsilon}$ is recursional binormal electric flexibility potential.

⋇ *The optical recursional ferromagnetic binormal electric visco microbeam model for $\phi(\boldsymbol{b_q})$ flexible binormal microscale beam is*

$$\begin{aligned}
&-\Bigg(\chi_3\Big(\frac{\partial}{\partial s}\Big(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Big)+\chi_1\Big(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Big)+(\chi_2^2+\chi_3^2)\chi_2\Big)-\chi_2\Big(\chi_1\Big(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\Big)\\
&+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\Big(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Big)\Big)-\nu(\chi_2^2+\chi_3^2)\Big)\Big(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Big)\\
&-\Bigg(\int_\alpha\Bigg(\Bigg(\chi_2\Big(\Big(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Big)\chi_2-\chi_3\Big(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Big)-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\Big)-\nu\Big(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\Big)\Bigg)\chi_1\\
&+\Bigg(\chi_3\Big(\frac{\partial}{\partial s}\Big(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Big)+\chi_1\Big(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Big)+(\chi_2^2+\chi_3^2)\chi_2\Big)-\chi_2\Big(\chi_1\Big(-\frac{\partial\chi_2}{\partial s}+\chi_3\chi_1\Big)+\chi_3(\chi_2^2+\chi_3^2)-\frac{\partial}{\partial s}\Big(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Big)\Big)\\
&-\nu(\chi_2^2+\chi_3^2))\chi_2)d\sigma)\Bigg(\int_\alpha\Big(-\Big(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Big)\chi_1\\
&+\Big(\frac{\partial}{\partial s}\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\chi_3\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)-\frac{\varsigma}{\epsilon}\chi_1\Big)\chi_2\Big)d\sigma\Bigg)+\Bigg(\chi_2\Big(\Big(-\frac{\partial\chi_2}{\partial s}+\chi_1\chi_3\Big)\chi_2-\chi_3\Big(\chi_2\chi_1+\frac{\partial\chi_3}{\partial s}\Big)\\
&-\frac{\partial}{\partial s}(\chi_2^2+\chi_3^2)\Big)-\nu\Big(\frac{\partial}{\partial s}\chi_3+\chi_2\chi_1\Big)\Bigg)\Bigg(\chi_3\Big(\psi-\frac{\varsigma}{\epsilon}\chi_1\Big)-\frac{\varsigma}{\epsilon}\chi_2+\frac{\partial}{\partial s}\chi_2\Big(1-\frac{\varsigma}{\epsilon}\Big)\Bigg)=0.
\end{aligned}$$

The optical resonator for visco Landau–Lifshitz binormal recursional electric $\phi(\boldsymbol{b_q})$ electric binormal optimistic density with quasi spherical ring resonator is illustrated in figure 3.

6. Conclusion

Optical electromagnetic flux designs are constructed by flexible fibers, optical waves and optical sonics. The results of optical spherical modelling of hybrid sonic electromagnetic crystals with geometrical applications are obtained [53–66].

In our manuscript, we give new explanations for an optical recursional visco Landau–Lifshitz binormal electromagnetical binormal microscale beam. Finally, we obtain an optical application for normalized visco Landau–Lifshitz electromagnetic binormal optimistic density with an optical binormal resonator.

References

[1] Hu Y and Zheng Z 2019 Progress in textile-based triboelectric nanogenerators forsmart fabrics *Nano Energy* **56** 16–24

[2] Leber A, Cholst B, Sandt J, Vogel N and Kolle M 2018 Stretchable thermoplastic elastomer optical fibers for sensing of extreme deformations *Adv. Funct. Mater.* **29** 1802629

[3] Rogers J A, Someya T and Huang Y 2010 Materials and mechanics for stretchable electronics *Science* **327** 1603–7

[4] Lu N and Kim D-H 2014 Flexible and stretchable electronics paving the way for soft robotics *Soft Rob.* **1** 53–62

[5] Ryu J *et al* 2018 Intrinsically stretchable multi-functional fiber with energy harvesting and strain sensing capability *Nano Energy* **55** 348–53

[6] Zhong J *et al* 2014 Fiber-based generator for wearable electronics and mobile medication *ACS Nano* **8** 6273–80

[7] Sun H, Zhang Y, Zhang J, Sun X and Peng H 2017 Energy harvesting and storage in 1D devices *Nat. Rev. Mater.* **2** 17023

[8] Körpınar T, Demirkol R C, Körpınar Z and Asil V 2020 Maxwellian evolution equations along the uniform optical fiber in Minkowski space *Revista Mexicana de Física* **66** 431–9

[9] Körpınar T, Demirkol R C, Körpınar Z and Asil V 2020 Maxwellian evolution equations along the uniform optical fiber in Minkowski space *Optik* **217** 164561

[10] Ricca R L 2005 Inflexional disequilibrium of magnetic flux-tubes *Fluid Dyn. Res.* **36** 319

[11] Körpınar Z and Körpınar T 2021 Optical hybrid electric and magnetic B_1-phase with Landau Lifshitz approach *Optik* **247** 167917

[12] Körpınar T, Körpınar Z and Yeneroğlu M 2021 Optical energy of spherical velocity with optical magnetic density in Heisenberg sphere space $\mathbb{S}^2_{Heis^3}$ *Optik* **247** 167937

[13] Körpınar T, Sazak A and Körpınar Z 2021 Optical effects of some motion equations on quasi-frame with compatible Hasimoto map *Optik* **247** 167914

[14] Körpınar Z and Körpınar T 2021 Optical tangent hybrid electromotives for tangent hybrid magnetic particle *Optik* **247** 167823

[15] Körpınar T, Demirkol R C and Körpınar Z 2021 Optical magnetic helicity with binormal electromagnetic vortex filament flows in MHD *Optik* **247** 167823

[16] Diaz A F and Felix-Navarro R M 2004 A semi-quantitative tribo-electric series for polymeric materials: the influence of chemical structure and properties *J. Electrostat.* **62** 277–90

[17] Wang Z L 2013 Triboelectric nanogenerators as new energy technology for selfpowered systems and as active mechanical and chemical sensors *ACS Nano* **7** 9533–57

[18] Sordo F *et al* 2019 Microstructured fibers for the production of food *Adv. Mater.* **31** e1807282

[19] Qu Y *et al* 2018 Superelastic multimaterial electronic and photonic fibers and devices via thermal drawing *Adv. Mater.* **30** 1707251

[20] Zhu S *et al* 2013 Ultrastretchable fibers with metallic conductivity using a liquidmetal alloy core *Adv. Funct. Mater.* **23** 2308–14

[21] Fassler A and Majidi C 2015 Liquid-phase metal inclusions for a conductive polymer composite *Adv. Mater.* **27** 1928–32

[22] Yan W *et al* 2019 Advanced multimaterial electronic and optoelectronic fibers and textiles *Adv. Mater.* **31** 1802348

[23] Körpınar T and Körpınar Z 2021 New version of optical spherical electric and magnetic flow phasewith some fractional solutions in $\mathbb{S}^2_{\mathbb{H}^3}$ *Optik* **243** 167378

[24] Körpınar T, Demirkol R C and Körpınar Z 2021 Magnetic helicity and electromagnetic vortex filament flows under the influence of Lorentz force in MHD *Optik* **242** 167302

[25] Körpınar T, Demirkol R C and Körpınar Z 2021 New analytical solutions for the inextensible Heisenberg ferromagnetic flow and solitonic magnetic flux surfaces in the binormal direction *Phys. Scr.* **96** 085219

[26] Körpınar T and Körpınar Z 2021 A new approach for fractional spherical magnetic flux flows with some fractional solutions *Optik* **240** 166906

[27] Gürbüz N 2005 The differantial formula of Hasimoto transformation in Minkowski 3-space *International Journal of Mathematics and Mathematical Sciences* **2005** 542381

[28] Körpınar Z and Körpınar T 2021 Optical hybrid electric and magnetic B_1-phase with Landau Lifshitz approach *Optik* **247** 167917

[29] Körpınar T, Körpınar Z and Yeneroğlu M 2021 Optical energy of spherical velocity with optical magnetic density in Heisenberg sphere space $\mathbb{S}^2_{Heis^3}$ *Optik* **247** 167937

[30] Körpınar T, Sazak A and Körpinar Z 2021 Optical effects of some motion equations on quasi-frame with compatible Hasimoto map *Optik* **247** 167914

[31] Körpınar Z and Körpınar T 2021 Optical tangent hybrid electromotives for tangent hybrid magnetic particle *Optik* **247** 167823

[32] Körpınar T, Körpınar Z and Asil V 2022 New approach for optical electroostimistic phase with optical quasi potential energy *Optik* **251** 168291

[33] Yu X *et al* 2017 A coaxial triboelectric nanogenerator fiber for energy harvesting and sensing under deformation *J. Mater. Chem.* A **5** 6032–7

[34] Dong K *et al* 2017 3D orthogonal woven triboelectric nanogenerator for effective biomechanical energy harvesting and as self-powered active motion sensors *Adv. Mater.* **29** 1702648

[35] He X *et al* 2017 A highly stretchable fiber-based triboelectric nanogenerator for self-powered wearable electronics *Adv. Funct. Mater.* **27** 1604378

[36] Li X *et al* 2014 3D fiber-based hybrid nanogenerator for energy harvesting and as a self-powered pressure sensor *ACS Nano* **8** 10674–81

[37] Zhang T *et al* 2017 High-performance, flexible, and ultralong crystalline thermoelectric fibers *Nano Energy* **41** 35–42

[38] Luo J and Wang Z L 2019 Recent advances in triboelectric nanogenerator based self-charging power systems *Energy Storage Mater.* **23** 617–28

[39] Wang Z L, Chen J and Lin L 2015 Progress in triboelectric nanogenerators as a new energy technology and self-powered sensors *Energy Environ. Sci.* **8** 2250–82

[40] Guo B and Ding S 2008 *Landau-Lifshitz Equations* (Singapore: World Scientific)

[41] Vieira V R and Horley P P 2012 The Frenet-Serret representation of the Landau-Lifshitz-Gilbert equation *J. Phys. A: Math. Theor.* **45** 065208

[42] Hasimoto H 1972 A soliton on a vortex filament *J. Fluid Mech.* **51** 477–85

[43] Ricca R L 1992 Physical interpretation of certain invariants for vortex filament motion under LIA *Physics of Fluids A: Fluid Dynamics* **4** 938–44

[44] Balakrishnan R, Bishop A R and Dandoloff R 1993 Anholonomy of a moving space curve and applications to classical magnetic chains *Phys. Rev.* B **47** 3108

[45] Barros M, Ferrández A, Lucas P and Merono M 1995 Hopf cylinders, B-scrolls and solitons of the Betchov-Da Rios equation in the 3-dimensional anti-De Sitter space *CR Acad. Sci. Paris, Série I* **321** 505–9

[46] Barros M, Ferrández A, Lucas P and Meroño M A 1999 Solutions of the Betchov-Da Rios soliton equation: a Lorentzian approach *J. Geom. Phys.* **31** 217–28

[47] Körpınar T 2020 Optical directional binormal magnetic flows with geometric phase: Heisenberg ferromagnetic model *Optik* **219** 165134

[48] Körpınar T, Körpınar Z and Demirkol R C 2020 Binormal schrodinger system of wave propagation field of light radiate in the normal direction with q-HATM approach *Optik* **235** 166444

[49] Körpınar T, Demirkol R C and Körpınar Z 2021 Polarization of propagated light with optical solitons along the fiber in de-sitter space *Optik* **226** 165872

[50] Körpınar T, Demirkol R C and Körpınar Z 2021 Approximate solutions for the inextensible Heisenberg antiferromagnetic flow and solitonic magnetic flux surfaces in the normal direction in Minkowski space *Optik* **238** 166403

[51] Körpınar T and Körpınar Z 2021 Timelike spherical magnetic flux flows with Heisenberg spherical ferromagnetic spin with some solutions *Optik* **242** 166745

[52] Körpınar T and Körpınar Z 2021 Spherical electric and magnetic phase with Heisenberg spherical ferromagnetic spin by some fractional solutions *Optik* **242** 167164

[53] Ashkin A, Dziedzic J M, Bjorkholm J E and Chu S 1986 Observation of a single-beam gradient force optical trap for dielectric particles *Opt. Lett.* **11** 288–90

[54] Ashkin A 1970 Acceleration and trapping of particles by radiation pressure *Phys. Rev. Lett.* **24** 156–9

[55] Dholakia K and Zemánek P 2010 Colloquium: gripped by light: optical binding *Rev. Mod. Phys.* **82** 1767–91

[56] Schief W K and Rogers C 2005 The Da Rios system under a geometric constraint: the Gilbarg problem *J. Geom. Phys.* **54** 286–300

[57] Körpınar T, Demirkol R C, Asil V and Körpınar Z 2022 Magnetic flux surfaces by the fractional Heisenberg antiferromagnetic flow of magnetic b-lines in binormal direction in Minkowski space *J. Magn. Magn. Mater.* **549** 168952

[58] Körpınar Z and Körpınar T 2022 Optical spherical electroosmotic phase and optical energy for spherical α-magnetic fibers *Optik* **255** 168455

[59] Körpınar Z and Körpınar T 2022 Optical antiferromagnetic electric $\mathbb{S}\alpha$-flux with electroosmotic velocity in Heisenberg $\mathbb{S}^2_{\mathbb{H}}$ *Optik* **252** 168206

[60] Körpınar T, Körpınar Z and Asil V 2022 Electric flux fibers with spherical antiferromagnetic approach with electroosmotic velocity *Optik* **252** 168108

[61] Körpınar T and Körpınar Z Optical electromagnetic flux fibers with optical antiferromagnetic model *Optik* **251** 168301

[62] Dong C, Page A G, Yan W, Nguyen-Dang T and Sorin F 2019 Microstructured multimaterial fibers for microfluidic sensing *Adv. Mater. Technol.* 1900417

[63] Seung W *et al* 2015 Nanopatterned textile-based wearable triboelectric nanogenerator *ACS Nano* **9** 3501–9

[64] Körpinar T and Körpinar Z 2023 Optical phase of recursional hybrid visco ferromagnetic electromagnetic microscale *Phys. Lett.* A 128651

[65] Körpınar T, Ünlütürk Y and Körpınar Z 2023 A new version of the motion equations of pseudo null curves with compatible Hasimoto map *Opt. Quantum Electron.* **55** 23

[66] Körpınar T, Demirkol R C and Körpınar Z 2022 Optical flux surfaces throughout normal evoluted flowlines in the presence of the modified visco effect *The European Physical Journal Plus* **137** 1168