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Optical viscous quantum ferromagnetic phase for recursional normalized dsβ-thermal radiation

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ABSTRACT. In this paper, we obtain optical magnetical recursional $\mathcal{DS}\beta-$microfluidics normalized $\Delta(\tau),\Delta(\nu),\Delta(\beta)$ bilayered $\mathcal{DS}\beta-$microbeam solidity. Then, we have Hydromagnetic recursional magnetical viscous ferromagnetic $\mathcal{DS}\beta-$microfluidics normalized $\mathcal{DS}\beta-$thermal $\Delta(\tau),\Delta(\nu),\Delta(\beta)$ radiations. Also, we present magnetical viscous ferromagnetic phase of $\mathcal{DS}\beta-$heat transport for nanofluid recursional $\mathcal{DS}\beta-$microfluidics normalized thermal $\Delta(\tau),\Delta(\nu),\Delta(\beta)$ radiations. Finally, we design optical thermal magnetical viscous ferromagnetic $\mathcal{DS}\beta-$conducting of $\Delta(\tau),\Delta(\nu),\Delta(\beta)$ bilayered $\mathcal{DS}\beta-$microbeams.

Keywords: energy; lie group; involutecurves.

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Introduction

The modeling of viscous ferromagnetic microfluidics in investigating electromagnetic phenomena, particularly focusing on the phase of electromagnetic waves. Optical hydromagnetic nanofluids are used to transmit light signals over long distances by exploiting the phenomenon of total thermal radiation (Copar et al., 2021; Körpinar & Körpinar, 2022a; Körpinar & Körpinar, 2023a; Sheikholeslami & Ganji, 2014; Körpinar et al., 2022b; Sheikholeslami, et al., 2014; Su et al., 2021; Mohammed et al., 2011; Körpinar et al., 2021; Körpinar et al., 2022c; Salman et al., 2013).

Optical nonlinear evolution systems in various optical models, including solid-state physics, chemical physics, plasma physics, optical physics, and fluid mechanics. Nonlinear complex phenomena are designed by nonlinear models. This nonlinearity is constructed by dynamics in various physical systems.

(Mahian et al., 2014; Ting et al., 2014; Prakash & Yeom 2014; Cheng et al., 2019; Rabiee et al., 2020; Raupov et al., 2022; Wang et al., 2009; Körpinar & Körpinar, 2023b; Abdulkarim et al., 2022; Körpinar & Körpinar, 2023c and d ;).

Optical waves and their microscale interpretations are obtained by physics, applicable to a wide range of physical and engineered systems. From the optical equations that characterize traveling wave solutions to their relevance in understanding microscale phenomena, the study of waves remains a cornerstone of scientific inquiry and technological innovation (Anjos, 2021; Körpinar et al., 2022c; Körpinar & Körpinar, 2022b; Zhao et al., 2022; Lapizco-Encinas, 2020; Korpinar et al., 2023; Singh et al., 2022; Ying, 2023; Fani et al., 2022; Zhang et al., 2020; Borys & Argyropoulos, 2022; Zevnik & Dular, 2020).

Nonlinear thermal radiation models take into account the nonlinear dependencies of radiative heat transfer on temperature and other parameters. These models provide a more accurate representation of radiation behavior, especially at high temperatures or in situations where temperature variations are significant. The consideration of optical quantum models with nonlinear thermal radiation represents a more sophisticated and precise approach to studying the impact of radiation on heat transfer and fluid flow, providing valuable insights for geometric and optical research (Körpinar & Demirkol, 2022; Körpinar & Körpinar, 2022d; Körpinar et al., 2022; Al-Khaled et al., 2020; Azam, 2022; Saffarian et al., 2020; Muhammad et al., 2021; Fatunmbi & Adeniyan, 2020).

The paper is organized as follows. First, we obtain optical magnetical recursional $\mathcal{DS}\beta-$microfluidics normalized $\Delta(\tau),\Delta(\nu),\Delta(\beta)$ bilayered $\mathcal{DS}\beta-$microbeams solidity. Finally, we have hydromagnetic recursional magnetical viscous ferromagnetic $\mathcal{DS}\beta-$microfluidics normalized $\mathcal{DS}\beta-$thermal $\Delta(\tau),\Delta(\nu),\Delta(\beta)$ radiations.

Materials and methods

Sitter frame is defined along particle τ as:

$$\nabla_\nu \tau = \nu$$
$$\nabla_\nu \nu = \tau + \chi\beta$$
$$\nabla_\nu \beta = \chi\nu,$$

where $\chi = \det(\boldsymbol{\tau}, \boldsymbol{\nu}, \nabla_\nu \boldsymbol{\nu})$

Lorentz forces for $\mathcal{S}_\beta$ −magnetic fiber is

$$\Delta(\tau) = \eta\nu,$$
$$\Delta(\nu) = \chi\beta + \eta\tau,$$
$$\Delta(\beta) = \chi\nu,$$
$$\mathcal{G}^\beta = -\eta\beta + \chi\tau,$$

where $\eta = \Delta(\boldsymbol{\nu}) \cdot \boldsymbol{\tau}$.

Optical normalization formula of $\Delta(\tau)$ is

$$\mathcal{N}\Delta(\boldsymbol{\tau}) = \lambda\boldsymbol{\nu}.$$

Calculating the derivative, we get

$$\nabla_t \Delta(\tau) = \varsigma_1 \eta\tau + \frac{\partial\eta}{\partial t}\nu + \eta(\chi\varsigma_1 + \frac{\partial\varsigma_2}{\partial\nu})\beta.$$

Optical recursional formula for $\Delta(\tau)$ is presented

$$\mathcal{R}\Delta(\tau) = -\chi\eta\tau + \eta_0\nu + \eta\beta,$$

where η_0 is recursional constant.

Recursional $\mathcal{DS}\beta$ −microfluidics normalized $\Delta(\tau)$ bilayered $\mathcal{DS}\beta$ −microbeam solidity is

$$\mathcal{S}\Delta(\tau) = (\pi_{\mathcal{N}}\mathcal{N}\Delta(\tau) + \pi_{\mathcal{R}}\mathcal{R}\Delta(\tau)) \cdot\!\vartriangleright_t \Delta(\tau),$$

where $\pi_{\mathcal{N}}$ is normalized $\mathcal{DS}\beta$ −microscale potential, and $\pi_{\mathcal{R}}$ is recursional $\mathcal{DS}\beta$ −microscale potential. Then

$$\mathcal{R}\Delta(\tau) = -\mathcal{N}(\nu \times \nabla_\nu \Delta(\tau)) = -\chi\eta\tau + \eta_0\nu + \eta\beta.$$

It follows that

$$J_{\Delta(\tau)} = -\chi\pi_{\mathcal{R}}\eta\tau + (\eta_0\pi_{\mathcal{R}} + \pi_{\mathcal{N}}\lambda)\nu + \pi_{\mathcal{R}}\eta\beta.$$

Also

$$\mathcal{S}\Delta(\tau) = J_{\Delta(\tau)} \cdot\!\vartriangleright_t \Delta(\tau).$$

*Magnetical recursional $\mathcal{DS}\beta$ −microfluidics normalized $\Delta(\tau)$ bilayered $\mathcal{DS}\beta$ −microbeam solidity is

$$\mathcal{S}\Delta(\tau) = -\chi\pi_{\mathcal{R}}\eta^2\varsigma_1 - \frac{\partial\eta}{\partial t}(\eta_0\pi_{\mathcal{R}} + \pi_{\mathcal{N}}\lambda) + \pi_{\mathcal{R}}\eta^2(\chi\varsigma_1 + \frac{\partial\varsigma_2}{\partial\nu}).$$

*Hydromagnetic recursional $\mathcal{DS}\beta$ −microfluidics normalized $\mathcal{DS}\beta$ −thermal $\Delta(\tau)$ radiation is

$$\mathcal{T}\Delta(\tau) = \frac{d}{dt_{\mathcal{R},\mathcal{N}}}(-\chi\pi_{\mathcal{R}}\eta^2\varsigma_1 - \frac{\partial\eta}{\partial t}(\eta_0\pi_{\mathcal{R}} + \pi_{\mathcal{N}}\lambda) + \pi_{\mathcal{R}}\eta^2(\chi\varsigma_1 + \frac{\partial\varsigma_2}{\partial\nu})).$$

*Optical phase of $\mathcal{DS}\beta$ −heat transport for nanofluid recursional $\mathcal{DS}\beta$ −microfluidics normalized $\mathcal{DS}\beta$ −thermal $\Delta(\tau)$ radiation is

$$\mathcal{P}\Delta(\tau) = \int_\phi (-\chi\pi_{\mathcal{R}}\eta^2\varsigma_1 + \pi_{\mathcal{R}}\eta^2(\chi\varsigma_1 + \frac{\partial\varsigma_2}{\partial\nu}) - \frac{\partial\eta}{\partial t}(\eta_0\pi_{\mathcal{R}} + \pi_{\mathcal{N}}\lambda))d\phi.$$

*Magnetical thermal $\mathcal{DS}\beta$ −conducting of$\Delta(\tau)$ bilayered $\mathcal{DS}\beta$ −microbeam is

$$\mathcal{C}\Delta(\tau) = \frac{d}{d\varepsilon}((-\chi\pi_{\mathcal{R}}\eta^2\varsigma_1 - \frac{\partial\eta}{\partial t}(\eta_0\pi_{\mathcal{R}} + \pi_{\mathcal{N}}\lambda) + \pi_{\mathcal{R}}\eta^2(\chi\varsigma_1 + \frac{\partial\varsigma_2}{\partial\nu})).$$

Since, we express

$$\Delta(\tau) \times \nabla_{\nu}^{2}\Delta(\tau) + \hbar\nabla_{\nu}\Delta(\tau) = (\eta(\frac{\partial}{\partial\nu}(\chi\eta) + \chi\frac{\partial\eta}{\partial\nu}) + \hbar\eta)\tau + \hbar\frac{\partial\eta}{\partial\nu}\nu + (\eta\hbar\chi - \eta(2\frac{\partial\eta}{\partial\nu}))\beta,$$

where $\hbar$ is $\mathcal{DS}\beta$ −viscous effect.

*Magnetical recursional viscous ferromagnetic $\mathcal{DS}\beta$ −microfluidics normalized $\Delta(\tau)$ bilayered viscous ferromagnetic $\mathcal{DS}\beta$ −microbeam solidity is

$$\mathcal{S}_{\hbar}\Delta(\tau) = \pi_{\mathcal{R}}\eta(\eta\hbar\chi - \eta(2\frac{\partial\eta}{\partial\nu})) - \chi\pi_{\mathcal{R}}(\eta(\frac{\partial}{\partial\nu}(\chi\eta) + \chi\frac{\partial\eta}{\partial\nu}) + \hbar\eta)\eta - \hbar(\eta_0\pi_{\mathcal{R}} + \pi_{\mathcal{N}}\lambda)\frac{\partial\eta}{\partial\nu}.$$

*Hydromagnetic recursional magnetical viscous ferromagnetic $\mathcal{DS}\beta$ −microfluidics normalized $\mathcal{DS}\beta$ −thermal $\Delta(\tau)$ radiation is

$$\mathcal{T}_{\hbar}\Delta(\tau) = \frac{d}{dt_{\mathcal{R},\mathcal{N}}}(-\chi\pi_{\mathcal{R}}(\eta(\frac{\partial}{\partial\nu}(\chi\eta) + \chi\frac{\partial\eta}{\partial\nu}) + \hbar\eta)\eta - \hbar(\eta_0\pi_{\mathcal{R}} + \pi_{\mathcal{N}}\lambda)\frac{\partial\eta}{\partial\nu} + \pi_{\mathcal{R}}\eta(\eta\hbar\chi - \eta(2\frac{\partial\eta}{\partial\nu}))).$$

*Magnetical viscous ferromagnetic phase of $\mathcal{DS}\beta$ −heat transport for nanofluid recursional $\mathcal{DS}\beta$ −microfluidics normalized thermal $\Delta(\tau)$ radiation is

$$\mathcal{P}_{\hbar}\Delta(\tau) = \int_{\phi}(-\chi\pi_{\mathcal{R}}(\eta(\frac{\partial}{\partial\nu}(\chi\eta) + \chi\frac{\partial\eta}{\partial\nu}) + \hbar\eta)\eta + \pi_{\mathcal{R}}\eta(\eta\hbar\chi - \eta(2\frac{\partial\eta}{\partial\nu})) - \hbar(\eta_0\pi_{\mathcal{R}} + \pi_{\mathcal{N}}\lambda)\frac{\partial\eta}{\partial\nu})d\phi.$$

*Thermal magnetical viscous ferromagnetic $\mathcal{DS}\beta$ −conducting of$\Delta(\tau)$ bilayered $\mathcal{DS}\beta$ −microbeam is

$$\mathcal{C}_{\hbar}\Delta(\tau) = \frac{d}{d\varepsilon}(\pi_{\mathcal{R}}\eta(\eta\hbar\chi - \eta(2\frac{\partial\eta}{\partial\nu}))) - \frac{d}{d\varepsilon}(\chi\pi_{\mathcal{R}}(\eta(\frac{\partial}{\partial\nu}(\chi\eta) + \chi\frac{\partial\eta}{\partial\nu}) + \hbar\eta)\eta) - \frac{d}{d\varepsilon}(\hbar(\eta_0\pi_{\mathcal{R}} + \pi_{\mathcal{N}}\lambda)\frac{\partial\eta}{\partial\nu}).$$

Results and discussion

$\mathcal{DS}\beta$ −Thermal $\Delta(\nu)$ radiation

Optical normalization formula of $\Delta(\nu)$ is

$$\mathcal{N}\Delta(\nu) = \eta\tau - \int_{\tau}(\eta + \chi^2)\nu + \chi\beta.$$

So, we can give

$$\nabla_{\nu}\Delta(\nu) = \frac{\partial\eta}{\partial\nu}\tau + (\eta + \chi^2)\nu + \frac{\partial\chi}{\partial\nu}\beta.$$

Optical recursional formula for $\Delta(\nu)$ is given

$$\mathcal{R}\Delta(\nu) = -\mathcal{N}(\nu \times \nabla_{\nu}\Delta(\nu)) = \int_{\tau}(\frac{\partial\chi}{\partial\nu} - \chi\frac{\partial\eta}{\partial\nu})\nu - \frac{\partial\chi}{\partial\nu}\tau + \frac{\partial\eta}{\partial\nu}\beta.$$

Also we can find that

$$\Delta(\mathbf{v}) \times \nabla_{\nu}^{2}\Delta(\mathbf{v}) + \hbar\nabla_{\nu}\Delta(\mathbf{v}) = (\hbar\frac{\partial\eta}{\partial\nu} - \chi(\frac{\partial}{\partial\nu}(\eta + \chi^2) + \frac{\partial\eta}{\partial\nu} + \chi\frac{\partial\chi}{\partial\nu}))\boldsymbol{\tau} + ((\hbar\eta + \chi^2\hbar) + (\frac{\partial^2\chi}{\partial\nu^2} + (\eta + \chi^2)\chi)\eta - \chi(\frac{\partial^2\eta}{\partial\nu^2} + (\eta + \chi^2)))\mathbf{v} + (\eta(\frac{\partial}{\partial\nu}(\eta + \chi^2) + \frac{\partial\chi}{\partial\nu}\chi + \frac{\partial\eta}{\partial\nu}) + \frac{\partial\chi}{\partial\nu}\hbar)\beta.$$

Therefore, we have

$$\nabla_t \Delta(\nu) = (\frac{\partial \eta}{\partial t} - \chi\varsigma_2)\tau + ((\chi\varsigma_1 + \frac{\partial \varsigma_2}{\partial \nu})\chi + \eta\varsigma_1)\nu + (\frac{\partial \chi}{\partial t} + \varsigma_2\eta)\beta.$$

Recursional $\mathcal{DS}\beta$ −microfluidics normalized $\Delta(\nu)$ bilayered $\mathcal{DS}\beta$ −microbeam solidity is

$$\mathcal{S}\Delta(\nu) = (\pi_{\mathcal{N}}\mathcal{N}\Delta(\nu) + \pi_{\mathcal{R}}\mathcal{R}\Delta(\nu)) \cdot\rhd_t \Delta(\nu),$$

where $\pi_{\mathcal{N}}$ is normalized microscale potential, and $\pi_{\mathcal{R}}$ is recursional $\mathcal{DS}\beta$ −microscale potential.

Then

$$\mathrm{J}_{\Delta(\nu)} = (\pi_{\mathcal{N}}\eta - \pi_{\mathcal{R}}\frac{\partial \chi}{\partial \nu})\tau + (\pi_{\mathcal{R}}\int_{\tau}(\frac{\partial \chi}{\partial \nu} - \chi\frac{\partial \eta}{\partial \nu}) - \pi_{\mathcal{N}}\int_{\tau}(\eta + \chi^2))\nu + (\pi_{\mathcal{R}}\frac{\partial \eta}{\partial \nu} + \pi_{\mathcal{N}}\chi)\beta.$$

Also

$$\mathcal{S}\Delta(\nu) = J_{\Delta(\nu)} \cdot\rhd_t \Delta(\nu).$$

*Magnetical recursional $\mathcal{DS}\beta$ −microfluidics normalized $\Delta(\nu)$ bilayered $\mathcal{DS}\beta$ −microbeam solidity is

$$\mathcal{S}\Delta(\nu) = (\frac{\partial \eta}{\partial t} - \chi\varsigma_2)(\pi_{\mathcal{N}}\eta - \pi_{\mathcal{R}}\frac{\partial \chi}{\partial \nu}) - (\pi_{\mathcal{R}}\int_{\tau}(\frac{\partial \chi}{\partial \nu} - \chi\frac{\partial \eta}{\partial \nu}) - \pi_{\mathcal{N}}\int_{\tau}(\eta + \chi^2))((\chi\varsigma_1 + \frac{\partial \varsigma_2}{\partial \nu})\chi + \eta\varsigma_1) + (\frac{\partial \chi}{\partial t} + \varsigma_2\eta)(\pi_{\mathcal{R}}\frac{\partial \eta}{\partial \nu} + \pi_{\mathcal{N}}\chi).$$

*Hydromagnetic recursional $\mathcal{DS}\beta$ −microfluidics normalized $\mathcal{DS}\beta$ −thermal $\Delta(\tau)$ radiation is

$$\mathcal{T}\Delta(\tau) = \frac{d}{dt_{\mathcal{R},\mathcal{N}}}((\frac{\partial \chi}{\partial t} + \varsigma_2\eta)(\pi_{\mathcal{R}}\frac{\partial \eta}{\partial \nu} + \pi_{\mathcal{N}}\chi) + (\frac{\partial \eta}{\partial t} - \chi\varsigma_2)(\pi_{\mathcal{N}}\eta - \pi_{\mathcal{R}}\frac{\partial \chi}{\partial \nu}) - (\pi_{\mathcal{R}}\int_{\tau}(\frac{\partial \chi}{\partial \nu} - \chi\frac{\partial \eta}{\partial \nu}) - \pi_{\mathcal{N}}\int_{\tau}(\eta + \chi^2))((\chi\varsigma_1 + \frac{\partial \varsigma_2}{\partial \nu})\chi + \eta\varsigma_1)).$$

*Optical phase of $\mathcal{DS}\beta$ − heat transport for nanofluid recursional $\mathcal{DS}\beta$ − microfluidics normalized $\mathcal{DS}\beta$ −thermal $\Delta(\nu)$ radiation is

$$\mathcal{P}\Delta(\nu) = \int_{\phi}(-(\pi_{\mathcal{R}}\int_{\tau}(\frac{\partial \chi}{\partial \nu} - \chi\frac{\partial \eta}{\partial \nu}) - \pi_{\mathcal{N}}\int_{\tau}(\eta + \chi^2))((\chi\varsigma_1 + \frac{\partial \varsigma_2}{\partial \nu})\chi + \eta\varsigma_1) + (\frac{\partial \eta}{\partial t} - \chi\varsigma_2)(\pi_{\mathcal{N}}\eta - \pi_{\mathcal{R}}\frac{\partial \chi}{\partial \nu}) + (\frac{\partial \chi}{\partial t} + \varsigma_2\eta)(\pi_{\mathcal{R}}\frac{\partial \eta}{\partial \nu} + \pi_{\mathcal{N}}\chi))d\phi.$$

*Magnetical thermal $\mathcal{DS}\beta$ −conducting of$\Delta(\tau)$ bilayered $\mathcal{DS}\beta$ −microbeam is

$$\mathcal{C}\Delta(\nu) = \frac{d}{d\varepsilon}((\frac{\partial \chi}{\partial t} + \varsigma_2\eta)(\pi_{\mathcal{R}}\frac{\partial \eta}{\partial \nu} + \pi_{\mathcal{N}}\chi)) - \frac{d}{d\varepsilon}((\pi_{\mathcal{R}}\int_{\tau}(\frac{\partial \chi}{\partial \nu} - \chi\frac{\partial \eta}{\partial \nu}) - \pi_{\mathcal{N}}\int_{\tau}(\eta + \chi^2))((\chi\varsigma_1 + \frac{\partial \varsigma_2}{\partial \nu})\chi + \eta\varsigma_1)) + \frac{d}{d\varepsilon}((\frac{\partial \eta}{\partial t} - \chi\varsigma_2)(\pi_{\mathcal{N}}\eta - \pi_{\mathcal{R}}\frac{\partial \chi}{\partial \nu})).$$

So, we easily obtain

$$\Delta(\nu) \times \nabla_\nu^2\Delta(\nu) + \hbar\nabla_\nu\Delta(\nu) = (\hbar\frac{\partial \eta}{\partial \nu} - \chi(\frac{\partial}{\partial \nu}(\eta + \chi^2) + \frac{\partial \eta}{\partial \nu} + \chi\frac{\partial \chi}{\partial \nu}))\tau + ((\hbar\eta + \chi^2\hbar) + (\frac{\partial^2 \chi}{\partial \nu^2} + (\eta + \chi^2)\chi)\eta - \chi(\frac{\partial^2 \eta}{\partial \nu^2} + (\eta + \chi^2)))\nu + \left(\eta\left(\frac{\partial}{\partial \nu}(\eta + \chi^2) + \frac{\partial \chi}{\partial \nu}\chi + \frac{\partial \eta}{\partial \nu}\right) + \frac{\partial \chi}{\partial \nu}\hbar\right)\beta,$$

where $\hbar$ is $\mathcal{DS}\beta-$viscous effect.

*Magnetical recursional viscous ferromagnetic $\mathcal{DS}\beta-$microfluidics normalized $\Delta(\nu)$ bilayered viscous ferromagnetic $\mathcal{DS}\beta-$microbeam solidity is

$$\mathcal{S}_{\hbar}\Delta(\nu) = (\pi_{\mathcal{N}}\eta - \pi_{\mathcal{R}}\frac{\partial\chi}{\partial\nu})(\hbar\frac{\partial\eta}{\partial\nu} - \chi(\frac{\partial}{\partial\nu}(\eta+\chi^2) + \frac{\partial\eta}{\partial\nu} + \chi\frac{\partial\chi}{\partial\nu})) - (\pi_{\mathcal{R}}\int_{\tau}(\frac{\partial\chi}{\partial\nu} - \chi\frac{\partial\eta}{\partial\nu}) - \pi_{\mathcal{N}}\int_{\tau}(\eta+\chi^2))((\hbar\eta + \chi^2\hbar) + (\frac{\partial^2\chi}{\partial\nu^2} + (\eta+\chi^2)\chi)\eta - \chi(\frac{\partial^2\eta}{\partial\nu^2} + (\eta+\chi^2))) + (\pi_{\mathcal{R}}\frac{\partial\eta}{\partial\nu} + \pi_{\mathcal{N}}\chi)(\eta(\frac{\partial}{\partial\nu}(\eta+\chi^2) + \frac{\partial\chi}{\partial\nu}\chi + \frac{\partial\eta}{\partial\nu}) + \frac{\partial\chi}{\partial\nu}\hbar).$$

*Hydromagnetic recursional magnetical viscous ferromagnetic $\mathcal{DS}\beta-$ microfluidics normalized $\mathcal{DS}\beta-$thermal $\Delta(\nu)$ radiation is

$$\mathcal{T}_{\hbar}\Delta(\nu) = \frac{d}{dt_{\mathcal{R},\mathcal{N}}}((\pi_{\mathcal{R}}\frac{\partial\eta}{\partial\nu} + \pi_{\mathcal{N}}\chi)(\eta(\frac{\partial}{\partial\nu}(\eta+\chi^2) + \frac{\partial\chi}{\partial\nu}\chi + \frac{\partial\eta}{\partial\nu}) + \frac{\partial\chi}{\partial\nu}\hbar) + (\pi_{\mathcal{N}}\eta - \pi_{\mathcal{R}}\frac{\partial\chi}{\partial\nu})(\hbar\frac{\partial\eta}{\partial\nu} - \chi(\frac{\partial}{\partial\nu}(\eta+\chi^2) + \frac{\partial\eta}{\partial\nu} + \chi\frac{\partial\chi}{\partial\nu})) - (\pi_{\mathcal{R}}\int_{\tau}(\frac{\partial\chi}{\partial\nu} - \chi\frac{\partial\eta}{\partial\nu}) - \pi_{\mathcal{N}}\int_{\tau}(\eta+\chi^2))((\hbar\eta + \chi^2\hbar) + (\frac{\partial^2\chi}{\partial\nu^2} + (\eta+\chi^2)\chi)\eta - \chi(\frac{\partial^2\eta}{\partial\nu^2} + (\eta+\chi^2)))).$$

*Magnetical viscous ferromagnetic phase of heat transport for nanofluid recursional $\mathcal{DS}\beta-$microfluidics normalized $\mathcal{DS}\beta-$thermal $\Delta(\nu)$ radiation is

$$\mathcal{P}_{\hbar}\Delta(\nu) = \int_{\phi}(-(\pi_{\mathcal{R}}\int_{\tau}(\frac{\partial\chi}{\partial\nu} - \chi\frac{\partial\eta}{\partial\nu}) - \pi_{\mathcal{N}}\int_{\tau}(\eta+\chi^2))((\hbar\eta + \chi^2\hbar) + (\frac{\partial^2\chi}{\partial\nu^2} + (\eta+\chi^2)\chi)\eta - \chi(\frac{\partial^2\eta}{\partial\nu^2} + (\eta+\chi^2))) + (\pi_{\mathcal{N}}\eta - \pi_{\mathcal{R}}\frac{\partial\chi}{\partial\nu})(\hbar\frac{\partial\eta}{\partial\nu} - \chi(\frac{\partial}{\partial\nu}(\eta+\chi^2) + \frac{\partial\eta}{\partial\nu} + \chi\frac{\partial\chi}{\partial\nu})) + (\pi_{\mathcal{R}}\frac{\partial\eta}{\partial\nu} + \pi_{\mathcal{N}}\chi)(\eta(\frac{\partial}{\partial\nu}(\eta+\chi^2) + \frac{\partial\chi}{\partial\nu}\chi + \frac{\partial\eta}{\partial\nu}) + \frac{\partial\chi}{\partial\nu}\hbar))d\phi.$$

*Thermal magnetical viscous ferromagnetic $\mathcal{DS}\beta-$conducting of $\Delta(\nu)$ bilayered $\mathcal{DS}\beta-$microbeam is

$$\mathcal{C}_{\hbar}\Delta(\nu) = \frac{d}{d\varepsilon}((\pi_{\mathcal{R}}\frac{\partial\eta}{\partial\nu} + \pi_{\mathcal{N}}\chi)(\eta(\frac{\partial}{\partial\nu}(\eta+\chi^2) + \frac{\partial\chi}{\partial\nu}\chi + \frac{\partial\eta}{\partial\nu}) + \frac{\partial\chi}{\partial\nu}\hbar)) - \frac{d}{d\varepsilon}((\pi_{\mathcal{R}}\int_{\tau}(\frac{\partial\chi}{\partial\nu} - \chi\frac{\partial\eta}{\partial\nu}) - \pi_{\mathcal{N}}\int_{\tau}(\eta+\chi^2))((\hbar\eta + \chi^2\hbar) + (\frac{\partial^2\chi}{\partial\nu^2} + (\eta+\chi^2)\chi)\eta - \chi(\frac{\partial^2\eta}{\partial\nu^2} + (\eta+\chi^2)))) + \frac{d}{d\varepsilon}((\pi_{\mathcal{N}}\eta - \pi_{\mathcal{R}}\frac{\partial\chi}{\partial\nu})(\hbar\frac{\partial\eta}{\partial\nu} - \chi(\frac{\partial}{\partial\nu}(\eta+\chi^2) + \frac{\partial\eta}{\partial\nu} + \chi\frac{\partial\chi}{\partial\nu}))).$$

$\mathcal{DS}\beta-$Thermal $\Delta(\beta)$ radiation

Optical normalization formula of $\Delta(\beta)$ is

$$\mathcal{N}\Delta(\beta) = \zeta\nu.$$

Hence, we find

$$\nabla_{\nu}\Delta(\beta) = \chi\tau + \frac{\partial\chi}{\partial\nu}\nu + \chi^2\beta.$$

Optical recursional formula for $\Delta(\tau)$ is presented

$$\mathcal{R}\Delta(\beta) = -\chi^2\tau + \eta_1\nu + \chi\beta,$$

thus, it is easy to see that there is the following equation:

$$\nabla_t \Delta(\beta) = \chi\varsigma_1\tau + \frac{\partial\chi}{\partial t}\nu + (\frac{\partial\varsigma_2}{\partial\nu} + \varsigma_1\chi)\chi\beta.$$

Recursional microfluidics normalized $\Delta(\beta)$ bilayered microbeam solidity is

$$\mathcal{S}\Delta(\beta) = (\pi_{\mathcal{N}}\mathcal{N}\Delta(\beta) + \pi_{\mathcal{R}}\mathcal{R}\Delta(\beta)) \cdot\rhd_t \Delta(\beta),$$

where $\pi_{\mathcal{N}}$ is normalized microscale potential, and $\pi_{\mathcal{R}}$ is recursional microscale potential.

Then

$$J_{\Delta(\beta)} = -\pi_{\mathcal{R}}\chi^2\tau + (\pi_{\mathcal{R}}\mathbb{k} + \pi_{\mathcal{N}}\zeta)\nu + \chi\pi_{\mathcal{R}}\beta.$$

Using these equations, we have

$$\mathcal{S}\Delta(\beta) = J_{\Delta(\beta)} \cdot\rhd_t \Delta(\beta).$$

*Magnetical recursional $\mathcal{DS}\beta$ −microfluidics normalized $\Delta(\beta)$ bilayered $\mathcal{DS}\beta$ −microbeam solidity is

$$\mathcal{S}\Delta(\beta) = -\pi_{\mathcal{R}}\varsigma_1\chi^3\tau - \frac{\partial\chi}{\partial t}(\pi_{\mathcal{R}}\mathbb{k} + \pi_{\mathcal{N}}\zeta) + \chi^2\pi_{\mathcal{R}}(\frac{\partial\varsigma_2}{\partial\nu} + \varsigma_1\chi).$$

*Hydromagnetic recursional $\mathcal{DS}\beta$ −microfluidics normalized $\mathcal{DS}\beta$ −thermal $\Delta(\beta)$ radiation is$\mathcal{T}\Delta(\beta) = \frac{d}{dt_{\mathcal{R},\mathcal{N}}}(-\frac{\partial\chi}{\partial t}(\pi_{\mathcal{R}}\mathbb{k} + \pi_{\mathcal{N}}\zeta) - \pi_{\mathcal{R}}\varsigma_1\chi^3\tau + \chi^2\pi_{\mathcal{R}}(\frac{\partial\varsigma_2}{\partial\nu} + \varsigma_1\chi)).$

*Optical phase of magnetical heat transport for nanofluid recursional $\mathcal{DS}\beta$ −microfluidics normalized $\mathcal{DS}\beta$ −thermal $\Delta(\beta)$ radiation is

$$\mathcal{P}\Delta(\beta) = \int_\phi (-\pi_{\mathcal{R}}\varsigma_1\chi^3\tau - \frac{\partial\chi}{\partial t}(\pi_{\mathcal{R}}\mathbb{k} + \pi_{\mathcal{N}}\zeta) + \chi^2\pi_{\mathcal{R}}(\frac{\partial\varsigma_2}{\partial\nu} + \varsigma_1\chi))d\phi.$$

*Magnetical thermal $\mathcal{DS}\beta$ −conducting of$\Delta(\tau)$ bilayered $\mathcal{DS}\beta$ −microbeam is

$$\mathcal{C}\Delta(\beta) = -\frac{d}{d\varepsilon}(\pi_{\mathcal{R}}\varsigma_1\chi^3)\tau - \frac{d}{d\varepsilon}(\frac{\partial\chi}{\partial t}(\pi_{\mathcal{R}}\mathbb{k} + \pi_{\mathcal{N}}\zeta)) + \frac{d}{d\varepsilon}(\chi^2\pi_{\mathcal{R}}(\frac{\partial\varsigma_2}{\partial\nu} + \varsigma_1\chi)).$$

Since, we express

$$\Delta(\beta) \times \nabla_\nu^2\Delta(\beta) + \hbar\nabla_\nu\Delta(\beta) = \left(3\frac{\partial\chi}{\partial\nu}\chi^2 + \hbar\chi\right)\tau + \hbar\frac{\partial\chi}{\partial\nu}\nu + \left(2\chi\frac{\partial\chi}{\partial\nu} + \chi^2\hbar\right)\beta,$$

where $\hbar$ is $\mathcal{DS}\beta$ −viscous effect.

*Optical recursional magnetical viscous ferromagnetic $\mathcal{DS}\beta$ −microfluidics normalized $\Delta(\beta)$ bilayered magnetical viscous ferromagnetic $\mathcal{DS}\beta$ −microbeam solidity is

$$\mathcal{S}_\hbar\Delta(\beta) = -\pi_{\mathcal{R}}\chi^2(3\frac{\partial\chi}{\partial\nu}\chi^2 + \hbar\chi) - (\pi_{\mathcal{R}}\mathbb{k}$$
$$+\pi_{\mathcal{N}}\zeta)\hbar\frac{\partial\chi}{\partial\nu} + \chi\pi_{\mathcal{R}}(2\chi\frac{\partial\chi}{\partial\nu} + \chi^2\hbar).$$

*Hydromagnetic recursional magnetical viscous ferromagnetic $\mathcal{DS}\beta-$ microfluidics normalized $\mathcal{DS}\beta$ −thermal $\Delta(\nu)$ radiation is

$$\mathcal{T}_\hbar\Delta(\beta) = \frac{d}{dt_{\mathcal{R},\mathcal{N}}}(\chi\pi_{\mathcal{R}}(2\chi\frac{\partial\chi}{\partial\nu} + \chi^2\hbar)$$
$$-\pi_{\mathcal{R}}\chi^2(3\frac{\partial\chi}{\partial\nu}\chi^2 + \hbar\chi) - (\pi_{\mathcal{R}}\mathbb{k} + \pi_{\mathcal{N}}\zeta)\hbar\frac{\partial\chi}{\partial\nu}).$$

*Magnetical viscous ferromagnetic phase of $\mathcal{DS}\beta$ −heat transport for magnetical nanofluid recursional $\mathcal{DS}\beta$ −microfluidics normalized $\mathcal{DS}\beta$ −thermal $\Delta(\nu)$ radiation is

$$\mathcal{P}_\hbar\Delta(\nu) = \int_\phi (-(\pi_{\mathcal{R}}\mathbb{k} + \pi_{\mathcal{N}}\zeta)\hbar\frac{\partial\chi}{\partial\nu}$$
$$-\pi_{\mathcal{R}}\chi^2(3\frac{\partial\chi}{\partial\nu}\chi^2 + \hbar\chi) + \chi\pi_{\mathcal{R}}(2\chi\frac{\partial\chi}{\partial\nu} + \chi^2\hbar))d\phi.$$

*Thermal magnetical viscous ferromagnetic $\mathcal{DS}\beta$ −conducting of$\Delta(\beta)$ bilayered $\mathcal{DS}\beta$ −microbeam is

$$\mathcal{C}_{\hbar}\Delta(\beta) = \frac{d}{d\varepsilon}(\chi\pi_{\mathcal{R}}(2\chi\frac{\partial\chi}{\partial\nu} + \chi^2\hbar)) - \frac{d}{d\varepsilon}(\pi_{\mathcal{R}}\chi^2(3\frac{\partial\chi}{\partial\nu}\chi^2 + \hbar\chi)) - \frac{d}{d\varepsilon}((\pi_{\mathcal{R}}\mathbb{k} + \pi_{\mathcal{N}}\zeta)\hbar\frac{\partial\chi}{\partial\nu}).$$

Application to $\mathcal{DS}\beta$ −microstructured magnetical viscous ferromagnetic phase

The study of thermal radiation in microfluidics construct significant viscous ferromagnetic phase for a range of applications, particularly in microelectromechanical systems (MEMS) and microscale thermal microstructured systems. Microscale thermal management is critical in high-power electronic devices, such as computer processors and power amplifiers. Utilizing thermal radiation in microfluidics designs dissipate heat efficiently in deSitter space. Thermal stimulation for magnetical viscous ferromagnetic phase of$\mathcal{DS}\beta$ −heat transport for magnetical nanofluid recursional$\mathcal{DS}\beta$ −microfluidics normalized $\mathcal{DS}\beta$ −thermal $\Delta(\tau), \Delta(\nu), \Delta(\beta)$ radiations are constructed in Figures 1, 2 and 3.

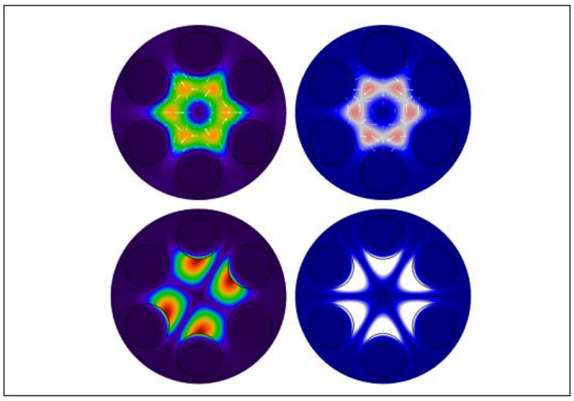

Figure 1. $\mathcal{DS}\beta$ −thermal $\Delta(\tau)$ radiation.

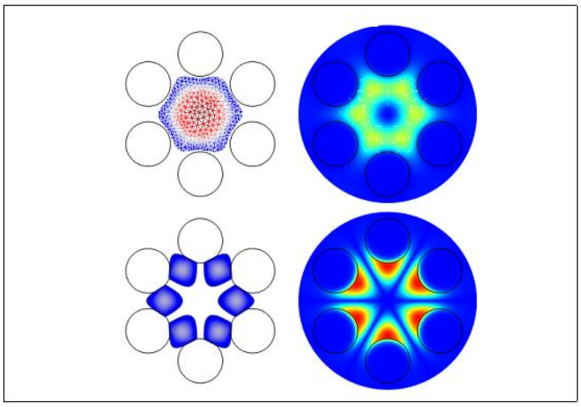

Figure 2. $\mathcal{DS}\beta$ −thermal $\Delta(\nu)$ radiation.

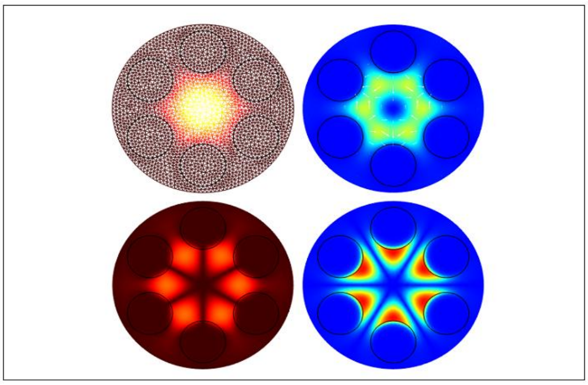

Figure 3. $\mathcal{DS}\beta$ −thermal $\Delta(\beta)$ radiation.

Conclusion

In this article, we present magnetical viscous ferromagnetic phase of $\mathcal{DS}\beta$ −heat transport for nanofluid recursional $\mathcal{DS}\beta$ −microfluidics normalized thermal $\Delta(\tau), \Delta(\nu), \Delta(\beta)$ radiations. Finally, we design optical thermal magnetical viscous ferromagnetic $\mathcal{DS}\beta$ −conducting of $\Delta(\tau), \Delta(\nu), \Delta(\beta)$ bilayered $\mathcal{DS}\beta$ −microbeams in de Sitter space.

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