

Abstract Submitted
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Semiflexible magnetic filaments ANDREJS CEBERS, Institute of Physics, Salaspils, LV-2169 — Extension of the Kirchhoff model of an elastic rod by taking into account the long-range magnetic interactions allows one to describe the semiflexible filaments with body couples. Their behaviour in some aspects is similar to the flagellas of different microorganisms driven by internal torques due to molecular motors. Basing on the model different new phenomena are described - buckling instability due to the action of body torques, selfpropulsion of the filament in an ac field, a periodic regime of the magnetic filament motion under the action of the shear flow and the field and others. Taking into account the thermal noise the crossover from $t^{3/4}$ to $t^{1/2}$ for the time dependence of the mean square displacement of the filament at magnetic field increase is predicted. The characteristics of semiflexible magnetic filaments can be studied by measuring their magnetic susceptibility in small ac magnetic field for which in the high- frequency range the scaling law $\omega^{-3/4}$ is obtained. Application of these results for the study of the properties of magnetotactic bacteria is discussed.

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