Abstract Submitted
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Dynamics of knotted flexible loops settling under a constant force in a viscous fluid[1] MAGDALENA GRUZIEL, Institute of Fundamental Technological Research, Polish Academy of Sciences, Pawińskiego 5B, 02-106, Warsaw, Poland, KRISHNAN THYAGARAJAN, GIOVANNI DIETLER, Ecole Polytechnique Federale de Lausanne, Lab Phys Living Matter, CH-1015 Lausanne, Switzerland, PIOTR SZYMCZAK, Institute of Theoretical Physics, Faculty of Physics, University of Warsaw, Pasteura 5, 02-093, Warsaw, Poland, MARIA EKIEL-JEZEWSKA, Institute of Fundamental Technological Research, Polish Academy of Sciences, Pawińskiego 5B, 02-106, Warsaw, Poland — Sedimenting chains of metal beads knotted to a topology of a torus knot tend to stabilize in the form of extended, flat, tightly interwound loops. In this configuration they perform an oscillatory motion of the loops swirling periodically around each other. Stokesian dynamics simulations of elastic fibers confirm the longlasting character of the traveling wavelike swirling motion and show also the accompanying rotation of the system. Moreover, the periodic motion shows striking resemblance to the stable solutions for the evolution of vortices of torus knot topology. Using the results of the simulations we study the dependence of the frequencies and sedimentation velocities on the length of the fiber. We also notice the dependence of the knot dynamics on the bending stiffness of the fiber and the knot rank.

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