Abstract Submitted
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On the geometry of stiff knots OLIVIER PIERRE-LOUIS, Oxford Theoretical Physics and LSP, Univ. J.Fourier, Grenoble — We report on the geometry and mechanics of knotted strings. We focus on the situation where the string is stiff (it has a large bending rigidity), and thin (its width is much smaller than its length). We find that: (i) the equilibrium energy depends on the type of knot as the square of the bridge number; (ii) braid localization is a general feature of stiff strings entanglements; (iii) there is an upper bound for the multiplicity of the braids and contact points in the ground state. (iv) Finally, a general confinement inequality is used to derive an upper bound on the knot gyration radius. We shall also discuss the asymptotic behavior of the knot when the filament width is small, both in the presence and in the absence of torsion (twist) energy. We conjecture a universal ground state geometry for thin strings with torsion rigidity in the presence of a large twists. Ref: R. Gallotti, O. Pierre-Louis, Phys. Rev. E 75, 031801 (2007).

Olivier Pierre-Louis
Oxford Theoretical Physics and LSP, Univ. J.Fourier, Grenoble

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