



**TIFR Centre for Interdisciplinary Sciences,
Narsingi, Hyderabad 500075**

Seminar

Slender axisymmetric Stokesian swimmers

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In this study, we investigate the swimming of a slender axisymmetrical body in a Newtonian fluid in the Stokes' regime. The slender body propels itself by generating travelling surface waves. The mathematical framework to study this problem has been built using the slender-body theory of Keller & Rubinow (J. Fluid Mech., vol. 75, part 4, pp. 705-714, 1976). The motion of the body and the dilation of its surface are incorporated by having Stokeslet and source distributions along the body's axis, and the propulsion speed is determined by solving the resulting integral equation using an asymptotic expansion. For high wave numbers, the propulsion speed for a cylinder is found to agree with results presented by Setter *et al.* (Phys. Rev. E 85, 066304, 2012) in the limit of vanishing cylinder radius and wave amplitude. We quantify the efficiency of the swimmer and explore its internal mechanics when the body is treated as a fluid-filled cavity with elastic fibres driving surface deformation.

Wednesday, Sep 11th 2013

4:00 PM (Tea/Coffee at 3:30 PM)

Conference Hall, TCIS