

# ROTATIONAL DYNAMICS

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## Street-Level High-Wire Man

**INTRODUCTION:** Consider Petit to have a mass  $m$  and a rectangular rod shape of length  $L$  as in Fig. 1. When he does not have the long rod (length  $2L$  and mass of  $m/2$ ) he easily rotates about his feet as shown. But, when Petit has the rod in hand at a distance  $L/2$  from his feet, he tends to not rotate as easily (see Fig. 2). **QUESTIONS:** (a) Find the moment of inertia about his feet ( $I$  in terms of  $L$  and  $m$ ) when he does not have the rod in hand (Fig 1)? (b) Find the moment of inertia (in terms of  $L$  &  $m$ ) of Petit + rod about his feet as shown in Fig. 2?

**HINT:**  $I_{\text{rod about end}} = 1/3 mL^2$ ,  $I_{\text{rod about cm}} = 1/12 mL^2$

**Parallel axis theorem:**  $I = I_{\text{about some axis}} + md^2$   
Where  $d$  = distance from original axis to new axis.

**ANSWERS:** (a)  $0.33 mL^2$  (b)  $\sim 0.622 mL^2$

Thus, it is more difficult to rotate with rod.

For more than 40 years, Mr. Petit, the French-born high-wire artist and street performer, has been defying credulity, most famously in 1974 when, just shy of his 25th birthday, **he spent 45 minutes suspended in the air between the World Trade Center towers, a feat chronicled in the 2008 Oscar-winning documentary "Man on Wire."** For his next act, Mr. Petit, 61, is making his tightrope disappear, at least briefly. In "Wireless!," a new one-man show that will run from Thursday through Saturday at the [Abrons Arts Center](http://www.abronartscenter.com), he will spend 90 minutes with his feet mostly on the ground, discussing and showcasing his other identities: juggler, magician, pickpocket, bullfighter, lock picker, motivational author. It's not an easy show to describe, he said, nor should it be. "I would love to conquer the world with it," he added with characteristic overstatement. (The exclamation mark in the title was his idea.)

