

The Euler instability – with molecules

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A straight rod compressed along its axis buckles at a finite critical compression force (the Euler instability). What happens if the rod in question is a molecule of double stranded DNA ? I will describe measurements of the elastic energy of short (6 nm) DNA molecules in solution constrained into a sharply bent conformation. We find that the molecule develops a kink at a critical torque $\tau_c \approx 27 \text{ pN} \times \text{nm}$. This system is related in several ways to the Euler instability.