Embeddedness-breaking of elastic flows

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In this talk we study the qualitative behavior of *elastic flows*, i.e. L^2-gradient evolutions of the Euler-Bernoulli elastic energy.

We are interested in the question of *embeddedness-preservation* — Can the evolution of an injective curve develop self-intersections?

In general, embeddedness is not preserved, as shown by S. Blatt (2010) for a large class of fourth order geometric flows. We can however expose an (optimal) energy threshold, under which evolutions still preserve embeddedness.

The optimal threshold has a geometric significance. To understand it we will enter the fantastic world of Euler's elastic curves.