

# Physical Review Letter on Breaking Spaghetti Leads to 2006 Ig Noble Award

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Basile Audoly and Sebastien Neukirch of the Université Pierre et Marie Curie earned the infamous 2006 Ig Noble prize for physics for their insights into why dry spaghetti often breaks into more than two pieces when it is bent. *Fragmentation of Rods by Cascading Cracks: Why Spaghetti Does Not Break in Half* was published in the American Physical Society journal *Physical Review Letters* in August of 2005.

Pasta-eaters and scientists alike have been puzzled by the physics of breaking spaghetti. Even Nobel Laureate Richard Feynman pondered the question. In order to solve the mystery Audoly and Neukirch experimented with several different thicknesses of dry spaghetti, which they clamped at one end, then bent and suddenly released, causing the strand to break.

According to their analysis, after release, the rod's curvature initially increases near the just-released end. Then a wave travels along the pasta. The first break occurs somewhere along the rod when the curvature exceeds a critical limit. The shock of the initial break then causes more bending waves to travel along the two newly formed pieces of the spaghetti, where they locally increase the curvature further and cause more breaks, leading to a cascade of cracks.

"I don't really follow kitchen science," says APS Public Outreach Specialist Kendra Rand, "but I'm sure it's great relief to kitchen physicists everywhere that Audoly and Neukirch have put this nagging issue to rest, and earned a prize for their efforts. Although, they might

have preferred a nice thank you card or something."

While the subject may at first seem a bit frivolous for the pages of a prestigious journal such as *Physical Review Letters*, it provides important information about the failure of any long, brittle structure. Bridge spans, buildings, vehicle parts, and human bones may fracture into multiple segments under some circumstances. Thanks to a study of pasta, Audoly and Neukirch have given us added understanding about why things break the way they do.

Source: American Physical Society

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