

Localized necking of a dielectric membrane under the action of an electric field

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Abstract: It is well-known that when a dielectric membrane coated with compliant electrodes is subjected to the combined action of an electric field and in-plane mechanical stretching, the nominal electric field may reach a maximum. It is widely believed that when this maximum is reached, a so-called pull-in instability will occur whereby the membrane thins down uniformly, leading to electrical breakdown. We show that this is a misconception and that it is in fact localized necking that will take place instead.

Prof Fu obtained a BSc in Mathematics and Mechanics (1982) from Central South University, China, and an MSc (1986) and a PhD (1988) in Theoretical Mechanics both from the University of East Anglia and supervised by Dr. Nigel Scott. He then spent three years in Exeter University as a post-doctoral research fellow working with Prof. Philip Hall on a US Air Force funded project. In 1991 he was appointed to a Lectureship at the University of Manchester. Six year later, he moved to Keele University as a Senior Lecturer. He was promoted to Reader in 1999 and became Professor of Applied Mathematics in 2001.