# Fingering instability of elastic adhesives

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We consider the growth of a fracture between an adhesive tape, composed of a thin incompressible elastic film bounded to a flexible plate, and a flat rigid substrate due to the peeling of the tape. Such a system is frequently used both in science and technology [see e.g. Newby et al. 1995].

It has been observed in this situation that the contact line between the elastic film and the substrate does not stay straight, but develops undulations, leading to a finger patterned adhesive zone. This instability differs from the Saffman-Taylor instability since it concerns even quasi-static peeling tests and purely elastic adhesive tapes without any viscous loss [Monch et al. 2001, Ghatack et al. 2003].

We propose a new model based on fracture mechanic that allows to explain quantitatively  the appearance of the instability. We obtain good agreement with experimental measurements such as the wavelength and the critical thickness above which the finger pattern disappears.

Refrences:

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