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Spiral and croissant crack in drying thin films JOEL MARTHELOT, BENOIT ROMAN, JOSE BICO, PMMH ESPCI ParisTech, ETIENNE BARTHEL, JEREMIE TEISSEIRE, DAVY DALMAS, SVI CNRS Saint Gobain, FRANCISCO MELO, USACH — Drying mud or crazing in ceramics glaze leads to familiar hierarchical cracks network where a new crack connects perpendicularly to older ones. We report unusual spirals and croissants crack patterns in methylsiloxane drying thin films moderately adhering on a substrate. Such cracks are also observed in a very different situation when magnetron sputtering multilayers are under external tension. The amplitude and wavelength of the pattern are robusts and are orders of magnitude larger than the thickness of the layer. The propagation of the spiral and croissant cracks occurs in a narrow range of adhesion energy between the film and the substrate and strain in the film. We will show how the propagation is driven by a cooperation between fracture and adhesion.

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