Regularity for minimizers of the Griffith fracture energy

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The Griffith criterion says that the energy to crack a brittle elastic material is proportional to the length of the crack. Understanding the regularity of minimizers requires unraveling the complex interplay of bulk (elastic) and surface (crack) energies in the vectorial setting of linearized frame indifference. In dimension 2, we prove that the crack of a minimizer is given by a $C^{1,\alpha}$ surface outside of a singular set of points with dimension strictly less than 1, analogous to results for the scalar-valued Mumford-Shah functional.

Joint work with Manuel Friedrich (FAU) and Camille Labourie (UPS).