Partial Regularity of Local Minimizers

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A strongly quasiconvex integral

$$I(u) = \int_\Omega F(\nabla u(x))\,dx$$

defined on suitable Sobolev maps $u\colon \Omega \subset \mathbb{R}^n \to \mathbb{R}^N$ can admit local minimizers (in various metrics) that are not global minimizers. In 1986 L.C. Evans showed that global minimizers $\bar{u}$ of $I(u)$ are partially regular: $\bar{u}$ is C^1 in an open subset of full n-dimensional measure in Ω. Recently, S. Müller and V. Šverák showed that $I(u)$ can admit extremals (i.e., weak solutions to the Euler-Lagrange equation: $\mathrm{div} F'(\nabla u) = 0$) that are Lipschitz, but nowhere C^1. In this talk I discuss the situation for local minimizers with respect to some natural metrics. The talk is based on joint work with Ali Taheri.