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Xavier Lamy, Andrew Lorent and Guanying Peng* (gpeng@wpi.edu). *Regularity of unit vector fields related to the Aviles-Giga functional.*

The variational analysis of the Aviles-Giga functional is a classical problem in the calculus of variations. The energy functional was used to model smectic liquid crystals and thin film blisters. In this talk I will present some results on sharp regularity for unit vector fields in \mathbb{R}^2 satisfying certain entropy conditions. These conditions are related to the zero energy states of the Aviles-Giga functional. The problem can be reformulated as a differential inclusion into a non-elliptic set $K \subset \mathbb{R}^{2 \times 2}$. As a consequence, we also get sharp regularity for solutions to this differential inclusion. This is joint work with Xavier Lamy and Andrew Lorent. (Received September 21, 2021)