1057-49-44 **A Lorent*** (`lorentaw@uc.edu`), Mathematics Department, University of Cincinnati, 2600 Clifton Ave., Cincinnati, OH 45221. *A quantitative characterisation of functions with low Aviles Giga energy on convex domains.*

Given a connected Lipschitz domain Ω we let $\Lambda(\Omega)$ be the subset of functions in $W^{2,2}(\Omega)$ with $u = 0$ on $\partial\Omega$ and whose gradient (in the sense of trace) satisfies $\nabla u(x) \cdot \eta_x = 1$ where η_x is the inward pointing unit normal to $\partial\Omega$ at x. The functional

$$I_\epsilon(u) = \frac{1}{2}\int_\Omega \epsilon^{-1}\left|1 - |\nabla u|^2\right|^2 + \epsilon\left|\nabla^2 u\right|^2$$

minimised over $\Lambda(\Omega)$ serves as a model in connection with problems in liquid crystals and thin film blisters, it is also the most natural higher order generalisation of the Modica Mortola functional. After surveying the area we will outline our recent result on the charactisation of low energy functions and domains:

There exists positive constant γ_1 such that if Ω is a convex set of diameter 2 and $u \in \Lambda(\Omega)$ with $I_\epsilon(u) = \beta$ then $|B_1(x)\triangle\Omega| \leq c\beta^{\gamma_1}$ for some x and

$$\int_\Omega \left|\nabla u(z) + \frac{z-x}{|z-x|}\right|^2 dz \leq c\beta^{\gamma_1}.$$

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