

## Convexity properties of the isoperimetric profile

Giorgio Saracco

*Scuola Internazionale Superiore di Studi Avanzati*

gsaracco@sissa.it

Gian Paolo Leonardi

*Università di Trento*

gianpaolo.leonardi@unitn.it

Given an open, bounded set  $\Omega$  we consider the isoperimetric profile  $\mathcal{J}$  that to each volume  $V \in [0, |\Omega|]$  associates the least perimeter  $P(E)$  among Borel subsets  $E$  of  $\Omega$  needed to enclose the given volume. We shall prove that for a wide class of planar sets, which encompasses convex sets, there exists a threshold  $\bar{V}$  such that  $\mathcal{J}$  is concave below it and convex above it. Moreover,  $\mathcal{J}^2$  is globally convex. In order to prove these properties, a full characterization of the isoperimetric sets will be provided. Some comments on the  $n$ -dimensional case will be given.