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Quantitative isoperimetric inequalities in capillarity problems

Friday, 11 July 2025 09:00 (1 hour)

The classical capillarity perimeter of a set in a half-space is defined as the sum of its relative perimeter inside the half-space and a constant multiple of the area of the portion of its boundary lying on the boundary of the half-space. The isoperimetric capillarity problem seeks to minimize the capillarity perimeter under a volume constraint. A classical isoperimetric inequality implies that suitable bubbles, given by truncations of balls, are minimizers of the capillarity problem.
In this talk, we present a sharp strong form of the quantitative isoperimetric inequality for the capillarity problem. We consider a notion of asymmetry that quantifies how much the unit normals to the boundary of a competitor deviate from those of an optimal bubble. Hence the inequality bounds this asymmetry from above in terms of the isoperimetric deficit of the competitor. Roughly speaking, the inequality bounds an H^1-notion of distance of a competitor from the set of minimizers in terms of its isoperimetric deficit.
The talk is based on results obtained in collaboration with Davide Carazzato (University of Vienna) and Giulio Pascale (University of Naples Federico II).

Presenter: POZZETTA, Marco (Politecnico di Milano)