Geometri

## A characterization of radial symmetry for composite media by overdetermined level sets

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In this talk, we introduce the concept of "overdetermined level set" (that is, a set where both a given function and the absolute value of its gradient are constant). As a corollary of J.Serrin's celebrated symmetry theorem for overdetermined elliptic problems, we know that the ball is the only domain such that the solution to some elliptic problem for the Dirichlet Laplacian, called the torsion problem, admits at least one overdetermined level set. Moving beyond the classical case, we study how this symmetry result generalizes to a multi-phase setting (that is, when the Laplacian is replaced with an elliptic operator in divergence form with piece-wise constant coefficients that take finitely many values). Notice that, in a multi-phase setting, various types of overdeterminations are possible, depending on the number and relative position of the overdetermined level sets. In this talk, we give a complete characterizion in the two-phase setting by means of overdetermined level sets. The content of this talk is based on a joint work with Giorgio Poggesi (Univ. of Western Australia).