On the nodal set of solutions to degenerate or singular elliptic equations with an application to $s-$harmonic functions

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We will discuss the geometric-theoretic analysis of the nodal set of solutions to degenerate or singular equations involving a class of operators including

$$L_a = \operatorname{div}(|y|^a \nabla),$$

with $a \in (-1, 1)$ and their perturbations.

As they belong to the Muckenhoupt class A_2, these operators appear in the seminal works of E. Fabes, C. Kenig, D. Jerison and R. Serapioni and have recently attracted a lot of attention in the last decade due to their link to the localization of the fractional Laplacian via the extension in one more dimension. Our goal is to develop a complete theory of the stratification properties for the nodal set of solutions of such equations in the spirit of the seminal works of R. Hardt, L. Simon, Q. Han and F.-H. Lin, giving several applications in the context on solutions to non-local elliptic equations with fractional Diffusions.

This is a joint work with Y. Sire and S. Terracini.