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Symmetries in anisotropic media.

Abstract: Imagine a carpet that is woven out of nonlinearly elastic strings whose deformation energy is given by $\sum_i \int_\Omega \left|\frac{\partial u}{\partial x_i}\right|^p \, dx$ with $1 < p < \infty$. The corresponding differential operator $\sum_i \frac{\partial}{\partial x_i}\left(\left|\frac{\partial u}{\partial x_i}\right|^{p-2} \frac{\partial u}{\partial x_i}\right)$ is reminiscent of the p-Laplace operator $\sum_i \frac{\partial}{\partial x_i}\left(|\nabla u|^{p-2} \frac{\partial u}{\partial x_i}\right)$, but obviously different from it and it has no rotation invariance. Therefore some standard symmetry results like the radial symmetry of the first eigenfunction if Ω is a ball or the Faber Krahn inequality have to be modified for this operator.
In my lecture I will explain to what extent such symmetry properties can be generalized and investigate also the limit $p \to \infty$. The results were obtained in cooperation with M. Belloni from Parma and V.Ferone from Napoli.