On a flower-shape geometry

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Several important problems arising in many research fields, such as physics and differential geometry, lead to consider elliptic equations when a lack of compactness occurs. From the mathematical point of view, the main interest relies on the fact that often the tools of nonlinear functional analysis, based on compactness arguments, cannot be used, at least in a straightforward way, and some new techniques have to be developed.

Aim of the talk is to present some of these techniques, which strongly use symmetry, together with their applications to elliptic problems with a variational structure. In particular we deal with a group theoretical scheme, raised in the study of problems which are invariant with respect to the action of orthogonal subgroups, and we present a construction, called flower-shape geometry, and its applications to the study of nonlinear problems set in strip-like domains. These results appeared in a joint paper with Giuseppe Devillanova (Politecnico di Bari) and Giovanni Molica Bisci (Urbino).