# Symmetry breaking in problems involving semilinear equations

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**Abstract**: This talk is concerned with two maximization problems where symmetry breaking arises. The first one consists in the maximization of the energy integral relative to a homogeneous Dirichlet problem governed by the elliptic equation $\nabla u = \chi u^q$ in the annulus $B_{a;a+2}$ of the plane. Here $0 < q < 1$ and $F$ is a varying subset of $B_{a;a+2}$, with a fixed measure. We prove that a subset which maximizes the corresponding energy integral is not symmetric whenever a is large enough. The second problem we consider is governed by the same equation in a disc $B_{a+2}$ when $F$ varies in the annulus $B_{a;a+2}$ keeping a fixed measure. So, now we have a so called maximization problem with a constraint. As in the previous case, we prove that a subset which maximizes the corresponding energy integral is not symmetric whenever a is large enough.