

# ASYMPTOTIC PROFILES FOR SINGULAR SOLUTIONS TO ELLIPTIC EQUATIONS WITH A SIGN-CHANGING NONLINEARITY

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ABSTRACT. Let  $B_1(0)$  denote the open unit ball in  $\mathbb{R}^n$  with  $n \geq 3$  and  $B^* := B_1(0) \setminus \{0\}$ . In this talk, we present recent classification results of the behaviour near zero for the positive solutions  $u \in C^\infty(B^*)$  of nonlinear elliptic equations such as

$$(1) \quad -\Delta u = \frac{u^{2^*(s)-1}}{|x|^s} - \mu u^q \text{ in } B^*,$$

where  $q > 1$ ,  $\mu > 0$  and  $s \in (0, 2)$  are fixed. Here,  $2^*(s) := \frac{2(n-s)}{n-2}$  is critical from the viewpoint of the Hardy–Sobolev embeddings. We say that 0 is a removable singularity for  $u$  if  $u$  can be extended at 0 by a Hölder function. Our aim is to analyse the behaviour of  $u$  at 0 in the non-removable case and reveal up to three types of singular behaviour.

This is joint work with Frédéric Robert (University of Lorraine).

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