

Sign-changing stationary solutions and blow up for the nonlinear heat equation in a ball

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(Joint work with T. Cazenave and F. Dickstein.) We prove that if ϕ is a radially symmetric, sign-changing stationary solution of the nonlinear heat equation

$$u_t = \Delta u + |u|^\alpha u, \quad (NLH)$$

in the unit ball of \mathbb{R}^N , $N \geq 3$, with Dirichlet boundary conditions, then the solution of (NLH) with initial value $\lambda\phi$ blows up in finite time if $|\lambda - 1| > 0$ is sufficiently small and if α is Sobolev subcritical and sufficiently close to $4/(N - 2)$.