

Critical Fujita exponents for semilinear heat equations with quadratically decaying potential

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In this talk we study the existence/nonexistence of global-in-time positive solutions of the Cauchy problem

$$(P) \quad \begin{cases} \partial_t u = \Delta u - V(x)u + u^p, & x \in \mathbb{R}^N, \quad t > 0, \\ u(x, 0) = \varphi(x) \geq 0, & x \in \mathbb{R}^N, \end{cases}$$

where $p > 1$ and V is a radially symmetric function decaying quadratically at the space infinity. We identify the so-called critical Fujita exponent for problem (P) and we show that the critical exponent depends on whether $L_V := -\Delta + V$ is subcritical, critical or supercritical.

This is a joint work with K. Ishige (University of Tokyo).