Optimal well-posedness and forward self-similar solution for the Hardy-Hénon parabolic equation

Noboru Chikami

Nagoya Institute of Technology
Japan
chikami.noboru@nitech.ac.jp

Joint work with: M. Ikeda, K. Taniguchi

The Cauchy problem for the Hardy-Hénon parabolic equation is studied in the critical and subcritical regime in weighted Lebesgue spaces on the Euclidean space $\mathbb{R}^d$. Well-posedness for singular initial data and existence of non-radial forward self-similar solution of the problem are previously shown only for the Hardy and Fujita cases ($\gamma \leq 0$) in earlier works. The weighted spaces enable us to treat the potential $|x|^\gamma$ as an increase or decrease of the weight, thereby we can prove well-posedness to the problem for all γ with $-\min\{2, d\} < \gamma$ including the Hénon case ($\gamma > 0$). As a byproduct of the well-posedness, the self-similar solutions to the problem are also constructed for all γ without restrictions. A non-existence result of local solution for supercritical data is also shown. Therefore our critical exponent s_c turns out to be optimal in regards to the solvability. This talk is based on a joint work with M. Ikeda (Keio U./RIKEN) and K. Taniguchi (Tohoku U.)