

1154-45-837

Yanzhi Zhang*, Department of Mathematics and Statistics, Missouri University of Science and Technology, 400 W 12th St, Rolla, MO 65409, and **Siwei Duo**. *Nonlocal Problems with the Tempered Fractional Laplacian*.

In this talk, I will present our recent work on nonlocal problems with the tempered integral fractional Laplacian. An accurate numerical method is presented to discretize the d -dimensional (for $d = 1, 2$, or 3) tempered integral fractional Laplacian, together with the rigorous numerical analysis. Since our method yields a (multilevel) Toeplitz stiffness matrix, one can design fast algorithms via the fast Fourier transform for efficient simulations. Finally, we study the tempered nonlocal effects on the solutions of various fractional PDEs, including the Allen-Cahn equation and Gray-Scott equations. (Received September 11, 2019)