

CRITICAL AND SUBCRITICAL SCHRÖDINGER PERTURBATIONS OF FRACTIONAL LAPLACIAN

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Let $p(t, x, y)$ be the fundamental solution of equation

$$\partial_t u(t, x) = \Delta^{\alpha/2} p(t, x).$$

I will consider the integral equation

$$\tilde{p}(t, x, y) = p(t, x, y) + \int_0^t \int_{\mathbb{R}^d} p(t-s, x, z) q(s, z) \tilde{p}(s, z, y) dz ds,$$

where $q(s, z)$ is some nonnegative function. The function \tilde{p} solving this equation will be called the Schrödinger perturbations of the function p by q . In the first part of the talk, I will present the general approach to this problem via perturbation series. Later, I will focus on the critical perturbations given by $q(x) = \kappa|x|^{-\alpha}$, where κ is some positive constant. I will present the estimates of the function \tilde{p} and discuss the blow-up phenomena for large values of κ .

The talk is based on the joint work with Krzysztof Bogdan, Tomasz Grzywny and Dominika Pilarczyk.