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Dirichlet's problem for critical Hamilton-Jacobi fractional equation

Using an extended approach of Dan Henry, we study solvability of the Dirichlet problem on a bounded smooth domain for the Hamilton-Jacobi equation with critical nonlinearity posed in Sobolev spaces:

$$\begin{cases} u_t + (-\Delta)^{1/2}u + H(u, \nabla u) = 0, t > 0, x \in \Omega, \\ \quad u(t,x) = 0, t > 0, x \in \partial\Omega, \\ \quad\quad u(0,x) = u_0, x \in \Omega. \end{cases}$$

We will also discuss the additional regularity and uniqueness of the limiting weak solution. The talk will be based on joint work with Tomasz Dlotko.