

## A connection between the stochastic heat equation and fractional Brownian motion, and a simple proof of a result of Talagrand

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### Abstract

We give a new representation of fractional Brownian motion with Hurst parameter  $H \in \frac{1}{2}$  using stochastic partial differential equations. This representation allows us to use the Markov property and time reversal, tools which are not usually available for fractional Brownian motion. We then give simple proofs that fractional Brownian motion does not hit points in the critical dimension, and that it does not have double points in the critical dimension. These facts were already known, but our proofs are quite simple and use some ideas of Lévy.

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