

Lévy 2016 Summer School on Lévy Processes

**SUPER-BROWNIAN MOTIONS WITH STABLE  
BRANCHING MECHANISM AND THEIR  
REGULARITY PROPERTIES**

LEONID MYTNIK

Super-Brownian motions are measure-valued processes that arise as limits of branching particle systems undergoing Brownian migration and critical, or asymptotically critical, branching. In low dimensions these processes could be described as solutions to stochastic partial differential equations.

We would like to describe the construction of the super-Brownian motion with stable branching mechanism and to give an overview of results on its regularity properties. In particular, we will show that the density at fixed times of the super-Brownian motion with stable branching is continuous in dimension  $d = 1$ , and locally unbounded in all higher dimensions where it exists. Also in dimension  $d = 1$  we determine pointwise and local Hölder exponents of the density, and discuss the multifractal spectrum corresponding to pointwise Hölder exponents.