HOMOGENIZATION OF PERIODIC DIFFUSION WITH SMALL JUMPS

NIKOLA SANDRIĆ

In this talk, we will discuss the problem of homogenization of a class of diffusions with jumps, that is, Feller processes generated by an integro-differential operator of the following type

$$\mathcal{A}f(x) = \frac{1}{2}\mathrm{Tr}\, C(x)D^2 f(x) + \int_{\mathbb{R}^d} \left(f(y+x) - f(x) - \langle y, \nabla f(x)\rangle 1_{\{z:|z|\leq 1\}}(y)\right) \nu(x, dy).$$

Under the assumptions that the underlying diffusion with jumps (i) has periodic coefficients, (ii) it admits only "small jumps" (that is, $\sup_{x\in\mathbb{R}^d}\int_{\mathbb{R}^d}|y|^2\nu(x, dy) < \infty$) (iii) and under certain additional regularity conditions, we show that the homogenized process is a Brownian motion. The presented results generalize the classical and well-known results related to the homogenization of diffusion processes.