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Diffusion with Redistribution

We will discuss a model of diffusion with spontaneous redistribution, recently presented by R. Pinsky. This could be viewed as a model for continuous diffusive behavior with occasional "catastrophic" redistribution events, resetting the system. The redistribution occurs at a spatially dependent rate. The diffusion and the redistribution processes are each well-understood classical objects, yet the interplay between the "fast", continuous diffusion and the "slow", non-local redistribution process is less studied. We will study this interaction as it appears through the exit time and exit distribution of the process from a domain. We will focus on the behavior when the rate of the redistribution tends to infinity, a regime in which the stark difference between the processes is amplified, and in which the interaction is the most interesting.