ENERGY DIFFUSION FOR SOME STOCHASTIC PARTICLE SYSTEMS WITH MECHANICAL ORIGIN

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To derive Fourier's law from mechanical models, we consider N-particle stochastic systems obtained as mesoscopic dynamics for energy transfer from N-particle microscopic mechanical models. From locally confined particles in interaction, and weakly coupled geodesic flows on d-dimensional manifolds of negative curvature, we obtain pure jump processes, called stochastic energy exchange models, and diffusion processes, called conservative energy Ginzburg-Landau models, describing the dynamics of energy distribution, respectively. We extract important common properties between them and characterize macroscopic behaviors of their generalizations under the condition that these common properties hold. More precisely, we give some results on the reversible measure, the spectral gap estimate and the macroscopic diffusion coefficient for these generalized processes under "natural" conditions.