Title:	Dynamical Structure Factor for Classical Spin Systems
Authors:	Prakash, Satyam
Keywords:	Dynamical Structure Classical Spin Systems
Issue Date:	Apr-2020
Publisher:	IISERM
Abstract:	Dynamical structure factor plots can be instrumental to analyse the collective dy- namics of a multi-particle system. It contains vital information about inter-particle correlation and the excitation spectrum. The work presented is a study on the classical Heisenberg dynamics of 1D and 2D spin systems and the information we can obtain from static structure factor and dynamical structure factor of the system. The initial spin configuration is generated by Monte-Carlo simulation and the temporal evolution of 2D spin system has been simulated using the coupled equation of motion. Using LLG equation, the system's movement in the configuration space is observed for the 2D XY lattice. Heisenberg Ferromagnets have quadratic dispersion while Heisenberg Antiferromagnets have linear dispersion independent of the lattice structure. To oth- erwise characterize the ferromagnets and antiferromagnets, the structure factor plots were obtained for 2D square lattice. Dynamical Structure Factor contains even more information as it is the quantity obtained in neutron scattering experiments. We studied the significance of Dynamical Structure Factor plots to study the system's dynamics and the system's approach to equilibrium. But we need to characterize the steady state behavior of Dynamical Structure Factors first. For that, we studied the non-newtonian flow regimes arising in 1D XY chain of classical rotors. The corre- spondence of dynamics of the flow regimes with Dynamical Structure Factor plots was experimented upon and analyzed.
URI:	http://hdl.handle.net/123456789/1445
Appears in Collections:	MS-15

Files in This Item:

File	Size	Format	
MS15083.pdf	85.92 MB	Adobe PDF	View/Open

Show full item record