SC13 Short lecture @ AICS

November 2013

Name	Dr. Shixun Zhang (AICS Computational Materials Science Research Team)
Title of your Presentation	Parallelization of Kernel Polynomial Method for Magnetic Skyrmion Simulations
Abstract	Kernel Polynomial Method (KPM) is an effective numerical method for evaluating eigenvalues of a huge Hamiltonian matrix with time complexity of O(N). Applying Chebyshev polynomials and appropriate kernel functions to KPM, one-particle as well as two-particle dynamical correlation functions are effectively estimated with controllable accuracy. The massive parallelism on supercomputers for accelerating the KPM algorithm is highly desirable for treating much larger systems. In our recent study KPM is used to simulate magnetic Skyrmion, a particle-like spiral spin texture, by solving the semi-classical double exchange model through exploiting the massive parallelism on supercomputer K.