Report on Using GRAPE-6 System in ADAC NAO
Category C
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Dynamical Evolution on Rotating Star Cluster

Two months opportunity to work using GRAPE system was firstly devoted to develop the Nbody4 code on the GRAPE-6 system. Second, I conducted some running tests to examine the stability of the code and to predict the required CPU time for simulations with large particle numbers. Figure 1 shows comparison of CPU time needed for one simulation unit using Nbody4 for simulation of single-mass cluster with Plummer distribution. Time required for one N-body simulation unit with 1-board GRAPE6 in ADAC-NAO are not so different compared to 4-board GRAPE6 in Tokyo Univ (data are provided by Holger Baumgardt, RIKEN), specially for particle number up to 10^4. However, it is very fast comparing to the ones using paralel computer Hydra in Astronomisches Rechen-Institut (ARI), Heidelberg, as well as in CRAY T3E.

This project was previously planned to investigate the influence of rotation on the dynamical evolution of dense (morethan 10k) star clusters, while simulations with smaller numbers (N=1000, 5000) have been done in Unix cluster machines (YITP) and parallel computer (ARI). In the near future, we plan to extend this project in order to investigate the formation of black hole inside the rotating dense stellar clusters.

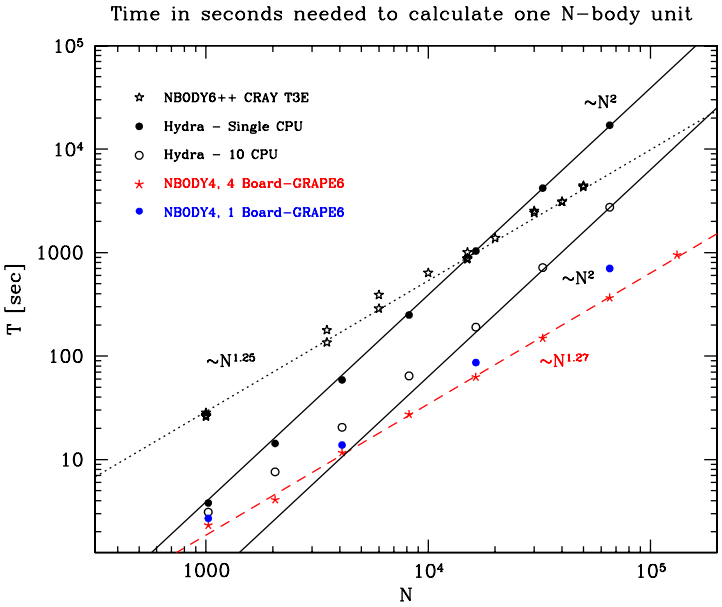

Figure 1: CPU time needed for one unit simulation as a function of particle number in Nbody simulation