Computational planetary science using FDPS (Framework for Developing Particle simulator)

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Particle-based simulations are widely used in the field of computational astronomy. Examples include the cosmological simulations or the planet-formation simulations with gravitational N body code, the simulations of star and galaxy formation with the Smoothed Particle Hydrodynamics (SPH) code or other particle-based codes, and the simulations of planetesimals formation with the Discrete Element Method (DEM) code. To develop an efficient program for particle-based simulation for large-scale parallel machines computer is not easy, and to some extent the efforts of many researchers have been spent on the programming and tuning. However, the algorithms of particle-based simulations are largely similar. Thus we have developed a framework which helps the researchers to develop efficient programs for particle-based simulation on large parallel machines, which we call Framework for Developing of Particle Simulators, or FDPS.
In this presentation, we introduce concept and implemantaion of FDPS. We also show some applications for planetary science using FDPS.

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