

[JJ] Evening Poster | M (Multidisciplinary and Interdisciplinary) | M-GI General Geosciences, Information Geosciences & Simulations

## [M-GI28]Development of computational sciences on planetary formation, evolution and surface environment

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Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Computer simulations have been recognized as one of the fundamental tools in understanding planetary formation, evolution and diversity of surface environment. However, it may be notified that the continuous development of computational abilities in recent years does not seem to be well utilized in improving numerical simulations in those fields; computational efficiency has been improved by 6 orders of magnitude compared from the early 90's, many of our simulations do not seem to catch up qualitatively and quantitatively such improvement. We propose here in this session to ask those who are interested in computational sciences of various fields not only of planetary formation and evolution but also of earth and planetary sciences in general to join. The aim is to discuss various scientific and technical aspects of our numerical simulations to improve our skills to fully utilize those development of computational resources that is realized or will be realized in near future as "K" to "post-K".

## [MGI28-P02]Speed-up efficiencies of an SPH code with FDPS on GPUs or PEZY-SCs

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Keywords:numerical hydrodynamics

Since the many important phenomena in planetary science are difficult to study by means of laboratory experiments, numerical simulations play an important role.

Smoothed Particle Hydrodynamics (SPH) is a widely used particle-based numerical hydrodynamic simulation method, which has advantages to deal with large deformation, multi-component and self-gravity.

Since the reliability of SPH depends on the number of particles used in each run, high-performance computing can be an important topic.

However, compared to mesh-based methods, it requires relatively high computational costs.

We have developed a framework, Framework for Developing Particle Simulator (FDPS) which automatically parallelise an arbitrary particle-based numerical code.

Thus, recently, it has been popular to apply so-called "accelerator", such as GPUs, to SPH.

Combining these two techniques, we have developed a massively parallel SPH code which works on either GPUs or PEZY-SCs.

We will report the speed-up efficiency of our code.