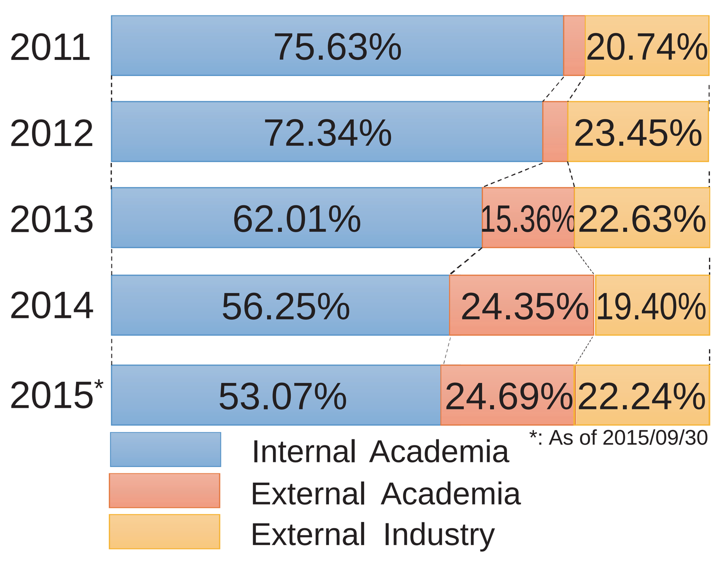
Industrial Use of TSUBAME2.5
Partnership Resource Allocations

TOKYO TECH Pursuing Excellence

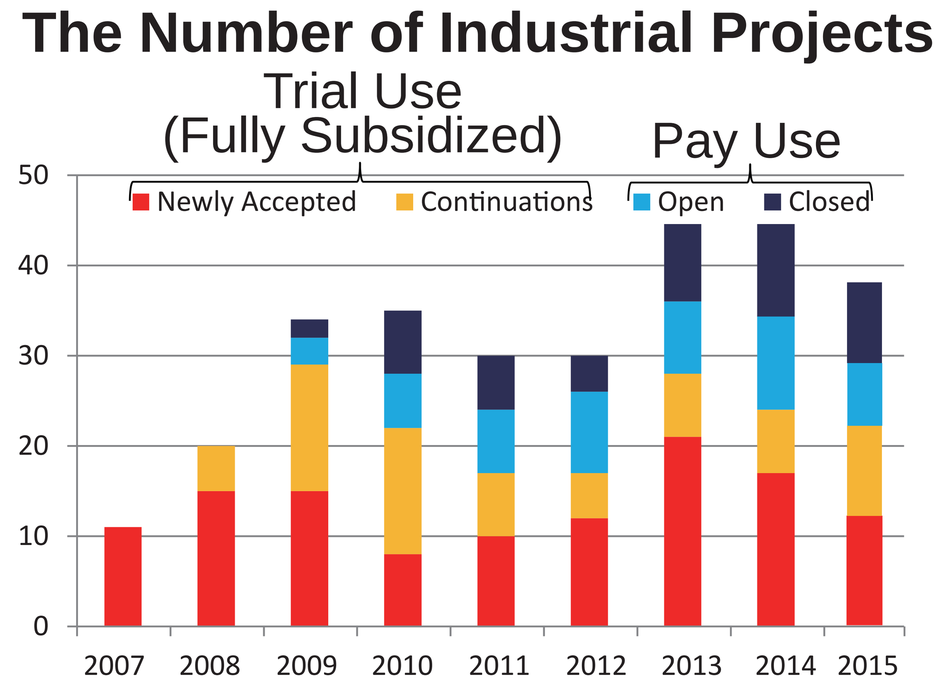
TSUBAME Industrial Use —Statistical Information—

TSUBAME is open to academia and industries. Industrial use started in FY2007.

TSUBAME Usage Profile



The Number of Industrial Projects



How to Use TSUBAME?

User types	Programs	Remarks column
Tokyo Tech Students and Professors		All students have TSUBAME accounts.
Non-Tokyo Tech Users	Partnership Resource Allocations	Academic and Industrial Use
	HPCI/JHPCN	Academic and Industrial Use Supported by MEXT
Industrial Users	Project for Creation of Research Platforms and Sharing of Advanced Research Infrastructure	Industrial Use Supported by MEXT
Foreign Researchers	International Collaboration	
Collaborators with Tokyo Tech Professors	Research Collaboration based on Research Fund or Industrial Contracts	

TSUBAME Services

Menu	Publicity	Price	Remarks
Trial Use	Open	Free	Supported by MEXT
Pay Use	Open	$0.33/NodeH	
	Closed	$1.33/NodeH	

Exchange rate is calculated with $1 = ¥120.

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"NodeH" is the unit for pricing. 1 NodeH is equivalent to 1 node for 1 hour.

For example, if you pay $33, you can use 100 nodes for 1 hour, or 1 node for 100 hours.

Each node has 2 Intel Xeon processors (12 cores) and 3 NVIDIA Tesla K20x GPUs, with 56GB Memory.

"Publicity: Open" requires company name, division, purpose to use and the report of result to be published.

"Publicity: Closed" only requires company name to be published.

Numerical simulation of air/water multiphase flows for ceramic sanitary ware design by multiple GPUs

This article is extracted from TSUBAME e-Science Journal Vol 8.

Akio Ikebata* Shinya Yoshida* Feng Xiao**

*TOTO LTD., Production technology center ** Tokyo Institute of Technology, Department of energy sciences

We have been developing an in-house CAE air/water two-phase numerical code for various purposes in design and manufacturing of plumbing products such as ceramic sanitary wares. In order to re-produce the complex interfacial flows of air and water with adequate accuracy, large scale computations are required with reliable numerical model, which is of great challenge. To this end, we have made efforts to improve the numerical schemes and port the code to the GPU platforms to accelerate the large scale computations for real-case applications. We have implemented large-scale simulation on the TSUBAME2.0 supercomputer by making effective use of the GPGPU architecture, and achieved significant improvement in both computational performance and simulation results.

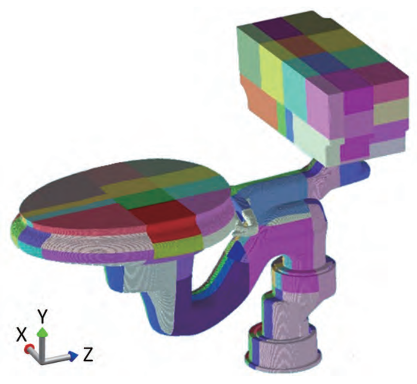

Fig. 7 Three dimensional parallel partition. (conceptual rendering)

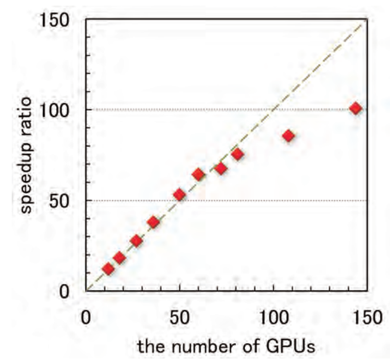

Fig. 9 Speedup of PCG solver by multi-GPUs.

Fig. 10 Real case simulation of Sanitary set by TSUBAME2.0 supercomputer.

Molecular Dynamics Simulation of Slurry Coating Process

This article is extracted from a report of FY2014 TSUBAME industrial use.

Project leader: Kei Morohoshi, Toyota Motor Corporation http://www.toyota.co.jp/

Keywords: electrode structure, evaporation, coarse-grained molecular dynamics, bead-spring model

Slurry coating process has been investigated by using coarse-grained molecular dynamics simulations. Supercomputer TSUBAME enables to deal with large-scale calculations, and that can realize a design of molecular structure. We reproduce the process that some fillers and polymer chains are gradually gathered during evaporation and finally form to complicated porous structure.

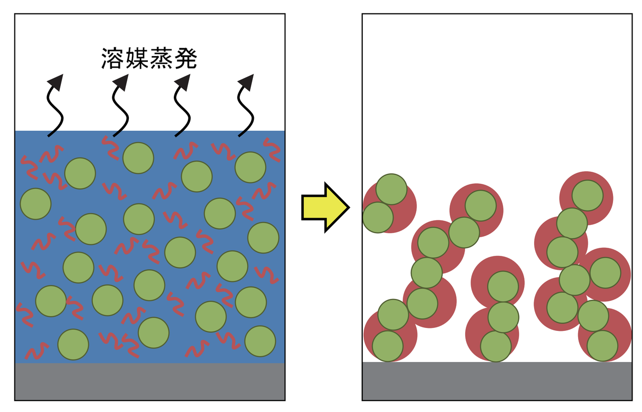

Fig. 1 Slurry coating process (Green: particles, Red: solute polymers, Blue: solvent molecules)

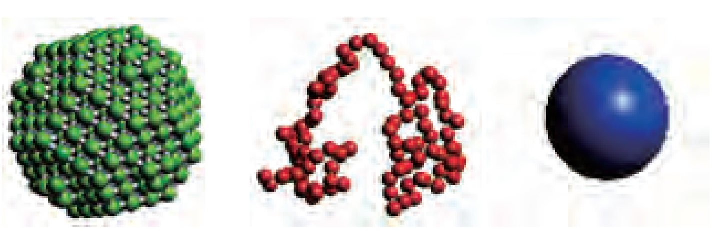

Fig. 2 Models of particle, solute polymer, and solvent molecule

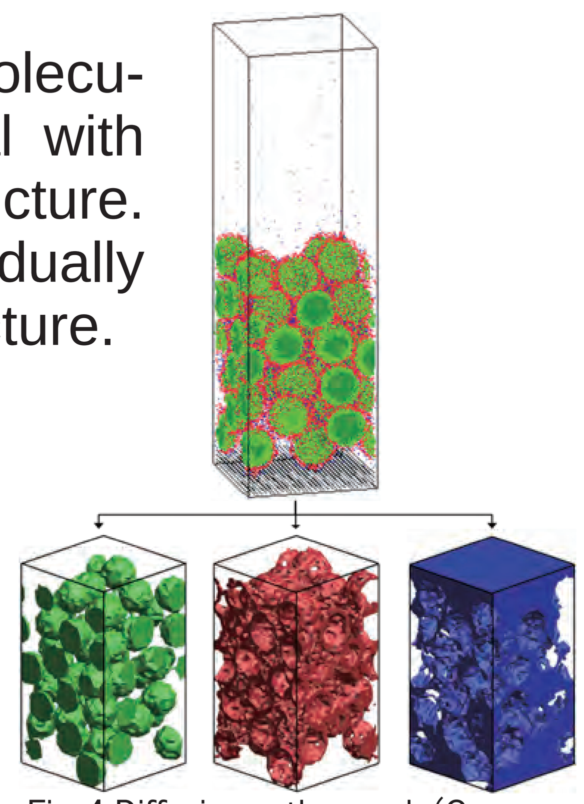

Fig. 4 Diffusion path search (Green: particles, Red: polymers, Blue: cavity)

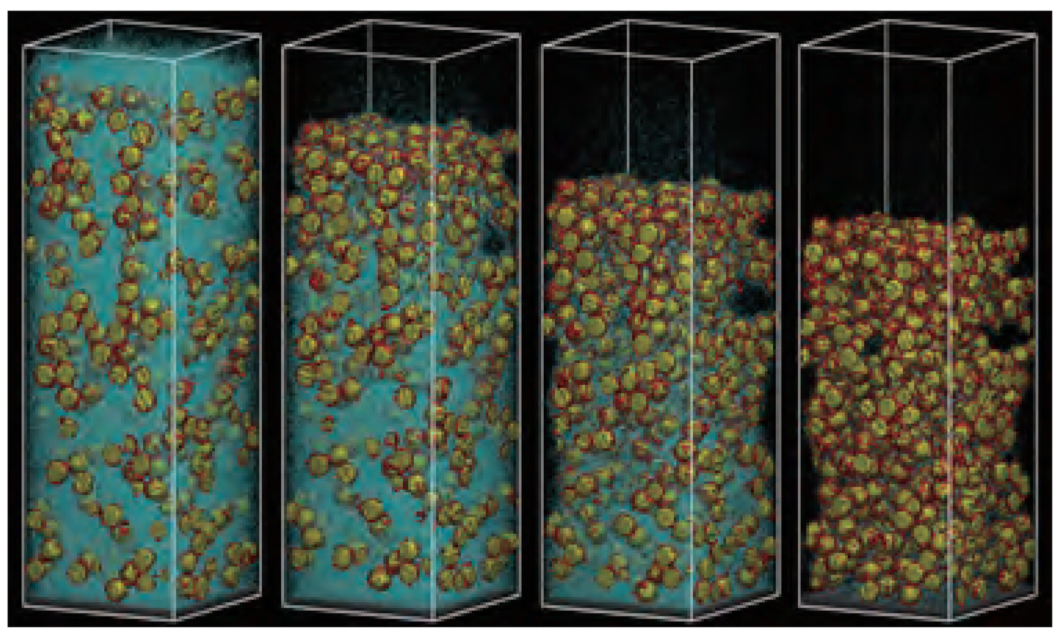

Fig. 5 Coarse-grained molecular dynamics simulation of slurry coating process

Research and Development of Environment Analysis Technique of Leaked Electromagnetic Field from Wireless Power Transfer

This article is extracted from a report of FY2014 TSUBAME industrial use.

Project leader: Kazuhiko Ikeda,

Panasonic System Networks R&D Lab. Co., Ltd. http://panasonic.co.jp/avc/psnrd/

Keywords: Electromagnetic simulation, Wireless power transfer, Leaked electromagnetic field

The wireless power transfer (WPT) system for electronics devices has been actively developed in recent years. Since the electromagnetic field leaked from the WPT system may cause the false operation of other devices, it is required to quantitatively evaluate the electromagnetic interference. In the housing environment, the WPT system is located generally close to the wireless communication devices. Therefore, the quantitative evaluation of the leaked electromagnetic field in various installation environments is indispensable. However, the measurement in the whole house involves immense amount of time and effort, and the electromagnetic simulation requires the enormous analysis meshes because of the volume of the house. In this paper, we evaluate the leaked electric field at 87 MHz, 815 MHz and 2.497 GHz in the house by electromagnetic simulation using supercomputer TSUBAME 2.5. The comparison between the simulation and measurement results is discussed.

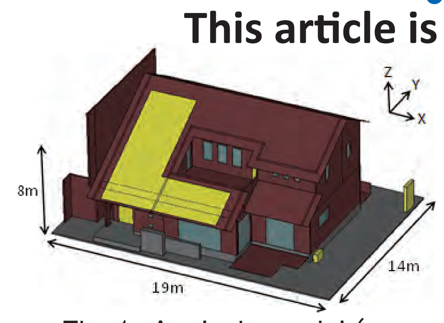

Fig. 1 Analysis model (a detached experimental house)

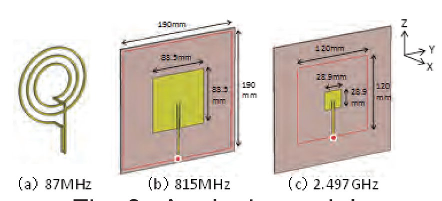

Fig. 2 Analysis models (wave sources)

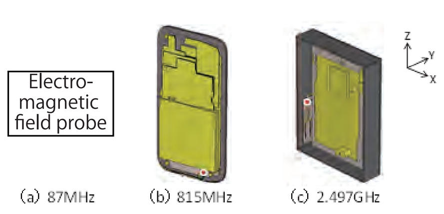

Fig. 3 Analysis models (receiver devices)

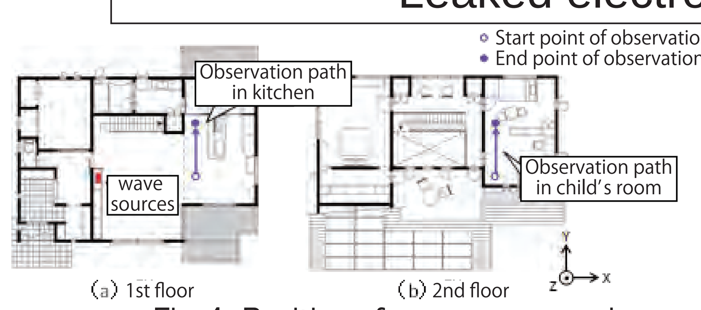

Fig. 4 Position of wave source and observation path (position of receiver devices)

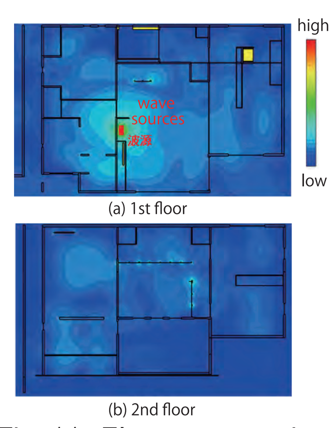

Fig. 11 Electromagnetic field distribution in the house (87 MHz)

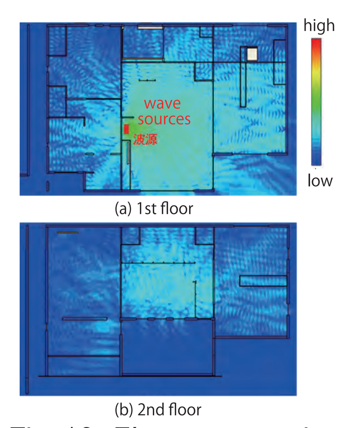

Fig. 12 Electromagnetic field distribution in the house (815 MHz)

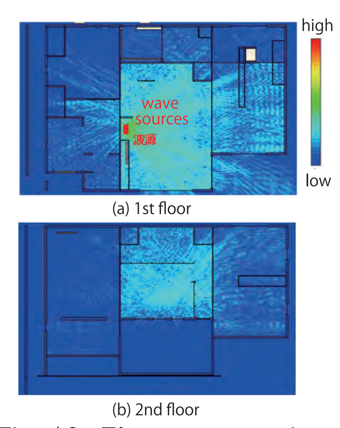

Fig. 13 Electromagnetic field distribution in the house (2.497 GHz)