Institute of SCIENCE TOKYO

Center for Information Infrastructure

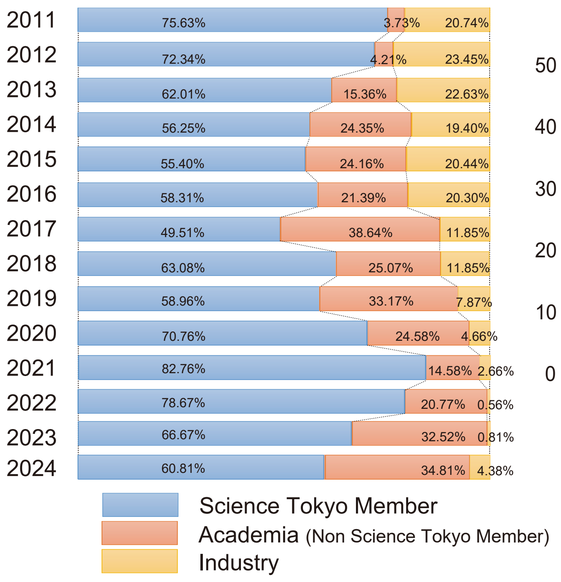
Joint Usage of TSUBAME

Partnership Resource Allocations

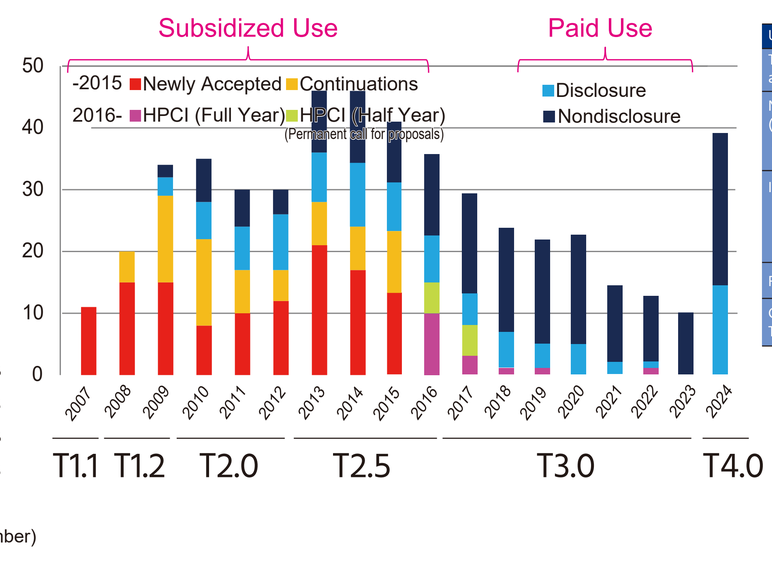
TSUBAME Industrial Use -Statistical Information-

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

TSUBAME Resource Usage Profile



The Number of Industrial Projects



How to Use TSUBAME?

User Types	Programs	Remarks
Tokyo Tech Students and Faculty Member		All Students have TSUBAME accounts.
Non-Tokyo Tech Users (Academic and Industrial Users)	Partnership Resource Allocations	
	HPCI/JHPCN	Supported by MEXT
Industrial Users	Project for Creation of Research Platforms and Sharing of Advanced Research Infrastructure (- 2015)	Supported by MEXT
	HPCI/JHPCN (2016 -)	Supported by MEXT
Foreign Researchers	International Collaboration	
Collaborators with Tokyo Tech Professors	Research Collaboration based on Research Fund or Industrial Contracts	

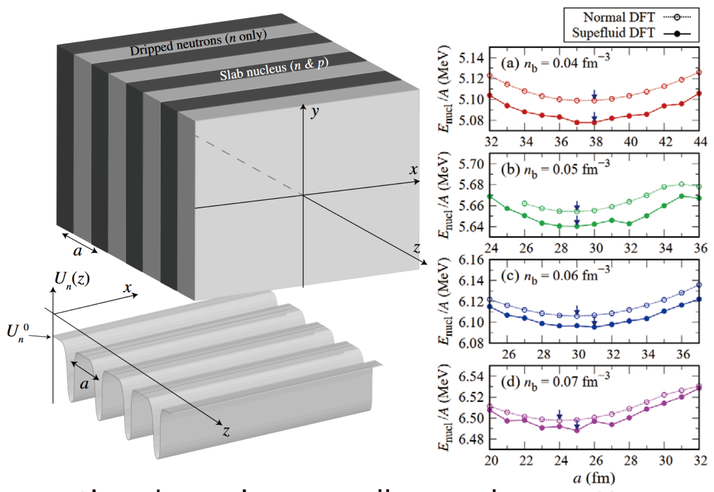
TSUBAME Services

Intellectual Property Rights are reserved completely by the users and are not required to be shared with Science Tokyo.

Each node has 2 AMD EPYC processors (96 cores) and 4 NVIDIA H100 (SXM5 94GB HBM2e) GPUs, with 768GB DDR5 Memory.

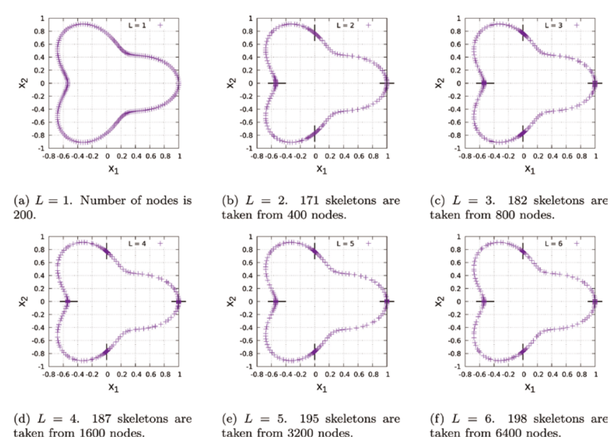
Achievements of joint usage (in HPCI and JHPCN)

Superfluid extension of the self-consistent time-dependent band theory for neutron star matter



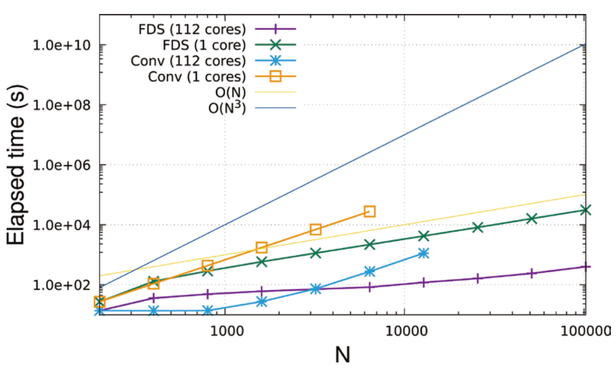
This work has developed a fully self-consistent time-dependent superfluid band theory for the inner crust of neutron stars based on time-dependent density-functional theory (TDDFT) extended for superfluid systems. It should be noted that our theoretical framework is much more realistic than other existing models on the market. Namely, our theory is based on the microscopic frame work of (TD)DFT, which can correctly describe properties of finite nuclei, not only static structure, but also excitations and reaction dynamics, as well as nuclear matter properties, in a unified way. By applying the real-time method, where we measure the collective mass of a nuclear cluster immersed in neutron superfluid through a response of the system to an external force, we have successfully extracted the conduction neutron number density and the macroscopic effective mass of dripped neutrons. Cited from: **K. Yoshimura, K. Sekizawa (2024), Physical Review C 109 (6), 065804**

A fast direct BEM for elastic wave scatterings by a cavity



(a) $L = 1$. Number of nodes is 200. (b) $L = 2$. 171 skeletons are taken from 400 nodes. (c) $L = 3$. 182 skeletons are taken from 800 nodes.

(d) $L = 4$. 187 skeletons are taken from 1600 nodes. (e) $L = 5$. 195 skeletons are taken from 3200 nodes. (f) $L = 6$. 198 skeletons are taken from 6400 nodes.



For developing an O(N) fast direct solver of elastic wave scattering problems in two dimensions, the proxy surface low-rank approximation method is extended to elastodynamics. Numerical experiments demonstrate that the proposed solver has a complexity of O(N) in the low-frequency range. Furthermore, multiple right-hand sides can be solved efficiently; specifically, when solving problems with 180 right-hand side vectors, the processing time per vector from the second vector onward was approximately 28,900 times faster than that for the first vector.

Cited from: **Y. Matsumoto, T. Maruyama (2025), Engineering Analysis with Boundary Elements 173, 106148**

Joint usage via HPCI and JHPCN project

The innovative High Performance Computing Infrastructure (HPCI)

National grid infrastructure for HPC research

Resources

- 15 supercomputers in Japan, including TSUBAME4.0
- 90PB global shared storage to share data

Status

- 13 projects use TSUBAME4.0 for the HPCI project on FY2024

For more details, please go to booth #2946 “Research Organization for Information Science & Technology (RIST)”

Joint Usage/Research Center for Interdisciplinary Large-scale Information Infrastructures (JHPCN)

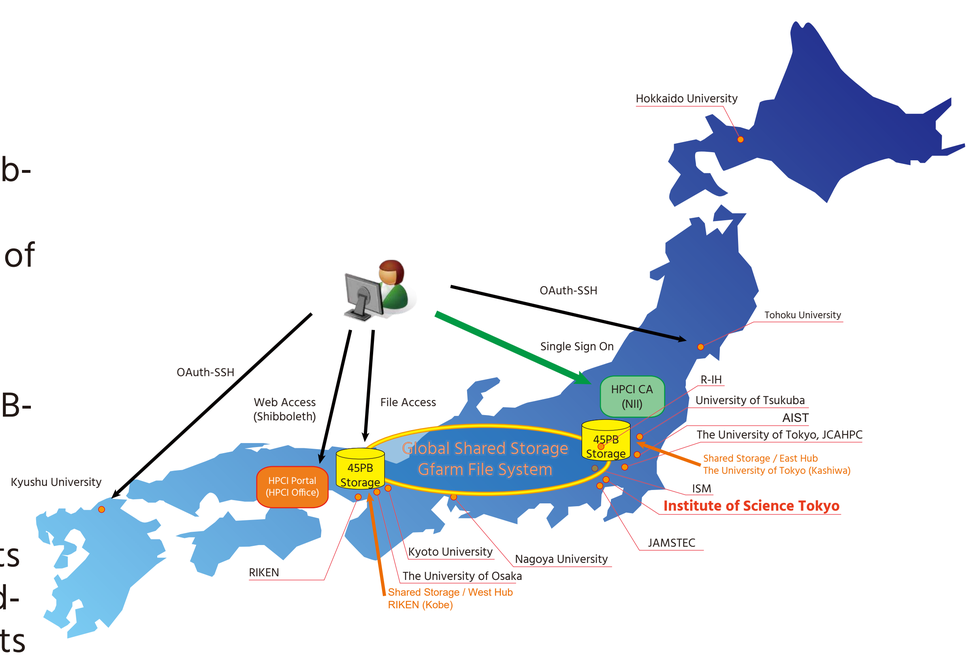
The Network-Type Research Center aims to contribute to the advancement and permanent development of the academic and research infrastructure of Japan

Resources Provider

- 8 supercomputer centers in Japan, including TSUBAME4.0

Status of Joint Research Projects

- 18 projects use TSUBAME4.0, and total 74 projects are adopted as JHPCN projects on FY2024, including international & Industry joint research projects



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