

“Plasma Simulator” was upgraded to a new system: total peak performance more than 10 Petaflops in June 2020

- **Plasma Simulator** was replaced to a new system in July 2020.
- The peak performance of the new PS system is 10.5PF, four times of the previous FX100 system.
- A new nickname “Raijin” to the new system.

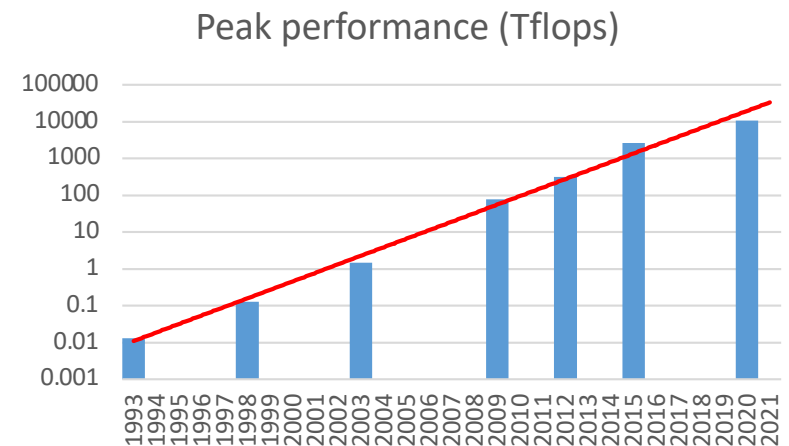
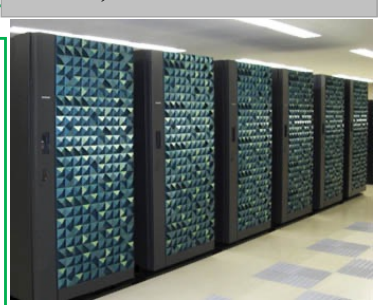


HITACHI SR16000/L2
(peak speed: 77TF
memory: 16TB
period: 2009 – 2012)

HITACHI SR16000/M2
(peak speed: 315TF
memory: 40TB
period: 2012 – 2015)

FUJITSU PRIMEHPC FX100
(peak speed: ~2.6PF memory:
~81TB
period: 2015-2020)

NEC SX-Aurora TSUBASA A412-8
(peak speed: ~10.5PF,
memory: ~200TB: period: 2020-2025)



The “Plasma Simulator” system has been developed and periodically upgraded for the NSRP



- Phase 1 (March 2009 – August 2012): HITACHI SR16000 model L2, with 128 nodes
- Phase 2 (October 2012 – March 2015): HITACHI SR16000 model M1, with 322 nodes
- June 2015 – Feb 2020: FUJITSU PRIMEHPC FX100 with 2592 nodes
- June 2020 – May 2025: NEC (model name TBD) with 4320 VE,
VE = Vector Engine (accelerator), 2.433 Fflops, 48GiB memory for each VE.

| | Peak Performance | Memory | Storage |
|------------------------------------|------------------|-----------------|---------|
| HITACHI SR16000 model L2 (Phase 1) | 77 TFlops | 16 TB | 0.5 PB |
| HITACHI SR16000 model M2 (Phase 2) | 315 TFlops | 40 TB | 2.0 PB |
| FUJITSU FX-100 | 2.62 PFlops | 81 TB | 10.0 PB |
| NEC (model name TBD) | 10.5 PFlops | 202TB (VE part) | 32.1 PB |

NEC SX-Aurora TSUBASA A412-8



- Plasma Simulator was ranked for 65th in the world (7th in Japan) in June 2009, 96th (8th in Japan) in Dec. 2012, 27th (3rd in Japan) in June 2015, 33rd (3rd in Japan) in November 2020 on the “TOP 500 LIST”.
- PS was ranked 12th in the world (2nd in Japan) on the “High Performance Conjugate Gradients (HPCG)” in June 2015 and 10th in the world (3rd in Japan), too.

60-90 projects every year were performed as Plasma Simulator Collaboration Research in 2016-2021

| FY | Research Projects | Users (NIFS/Univ.) | Simulation Jobs |
|------|-------------------|--------------------|-----------------|
| 2012 | 56 | 169 (50/119) | 16,684 |
| 2013 | 51 | 158 (50/108) | 19,548 |
| 2014 | 53 | 162 (50/112) | 21,540 |
| 2015 | 60 | 154 (49/105) | 46,078 |
| 2016 | 65 | 184 (50/134) | 70,041 |
| 2017 | 67 | 194 (45/149) | 90,730 |
| 2018 | 68 | 194 (50/144) | 96,796 |
| 2019 | 68 | 189 (52/137) | 62,227 |
| 2020 | 86 | 243 (60/183) | 64,643 |
| 2021 | 85 | 240 (56/184) | 30,473 |

- There are about 160-190 users each year with 60 or less from NIFS and 105-149 or more from universities.
- More than 90,000 jobs are run on Plasma Simulator in recent years.
- The average operating rate (ratio of successful computations to the total machine time) is 80-90%.

出版論文のNAISへの登録と謝辞の記載について

核融合科学研究所の共同研究成果が論文として発表された場合、核融合科学研究所論文情報システム (NAIS) への論文の登録をお願いしています。プラズマシミュレータを用いての共同研究「プラズマシミュレータ共同研究」も該当します。なお、NAIS (<http://nais.nifs.ac.jp>) のアカウントは、同ページの“New user”登録で申請できます。

また論文には、謝辞として、核融合科学研究所の共同研究として行われた研究であることを記載し、共同研究の研究コードも明示していただくこともお願いしています。研究コードは、NIFS共同研究データベースシステム NOUS (<https://nous.nins.jp/>) の共同研究採択課題一覧でご覧いただけます。

下記に、英文謝辞の雛形を示しました。

This work is performed on “Plasma Simulator” (NEC SX-Aurora TSUBASA) of NIFS with the support and under the auspices of the NIFS Collaboration Research program (NIFS**#####**).

共同研究公募案内には、謝辞に核融合科学研究所の共同研究である旨を表示する依頼があります。一方、上の文章はそれに加えて、プラズマシミュレータを使ったことも合わせて明示することをお願いするものです。よろしく願いいたします。