

Dan slovenskega superračunalniškega omrežja, MREŽA ZNANJA
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EURO



SLING

Plasma-PEPSC CoE

Pushing Flagship Plasma Simulation Codes to Tackle Exascale-Enabled
Grand Challenges via Performance Optimisation and Codesign

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PLASMA PEPSC

Call: HORIZON-EUROHPC-JU-2021-COE-01 - Centres of Excellence preparing applications in the Exascale era

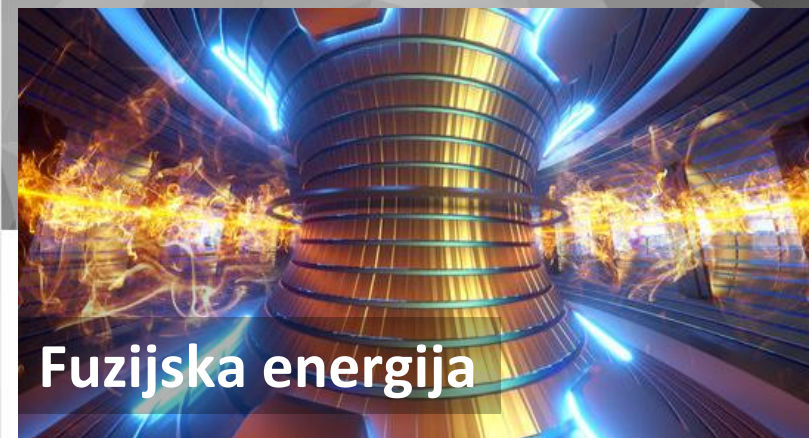
Duration: 4 Years. It started on Jan.1, 2023

Budget: 7.9M€

Partners:

- Academia: KTH (Coordinator), UoH, UL, TUM
- High-performance computing centers: BSC, PDC at KTH, and MPCDF at MPG.
- Research institutes and laboratories: IPP MPG, IPP CAS, FORTH, HZDR
- Industry: SIPEARL

Website: <https://plasma-pepsc.eu/>



Fuzijska energija



Pospeševalniki plazme



Vesoljska fizika

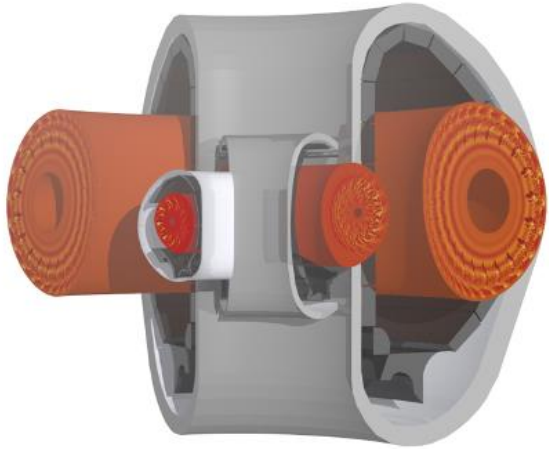
Plasma-PEPSC – Plasma Exascale- Performance Simulations CoE

Naša vizija:
**Potiskanje vodilnih plazemskih
simulacijskih kod za reševanje velikih
izzivov, ki jih omogoča eksaraven, z
optimizacijo zmogljivosti in
sooblikovanjem HPC**

Vodilne kode v centru odličnosti Plasma-PEPSC

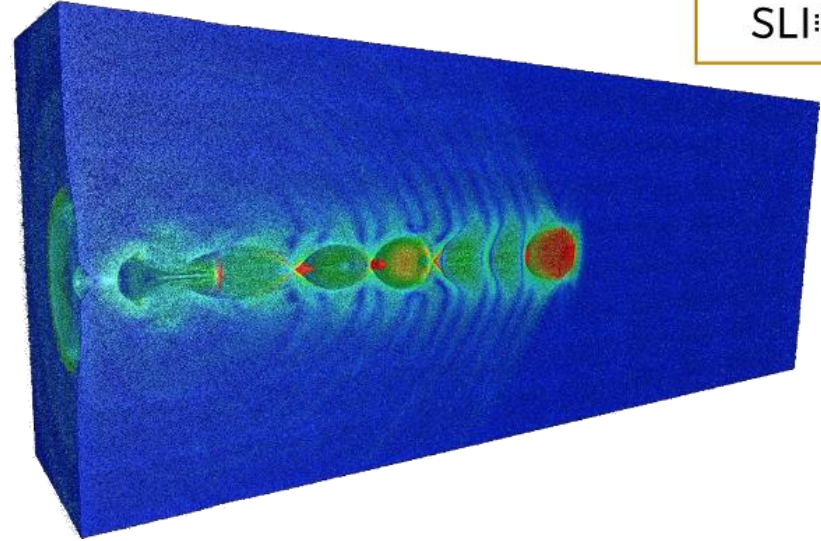


GENE / GENE-X



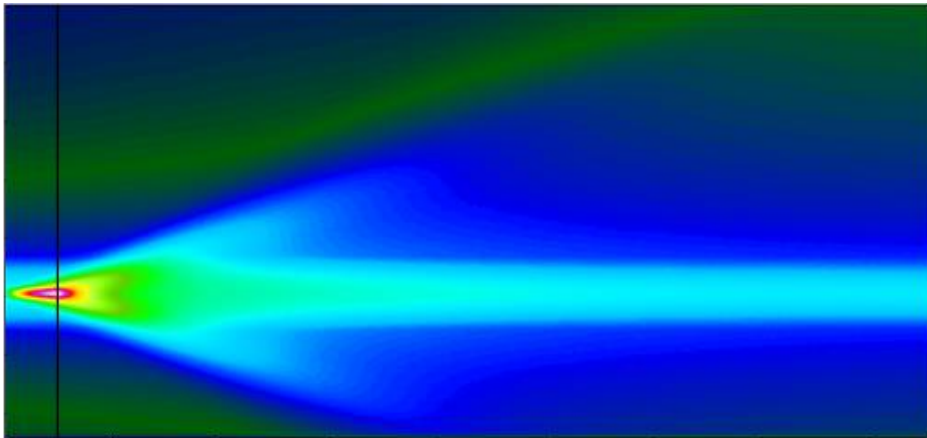
<https://genecode.org/>

PICongPU



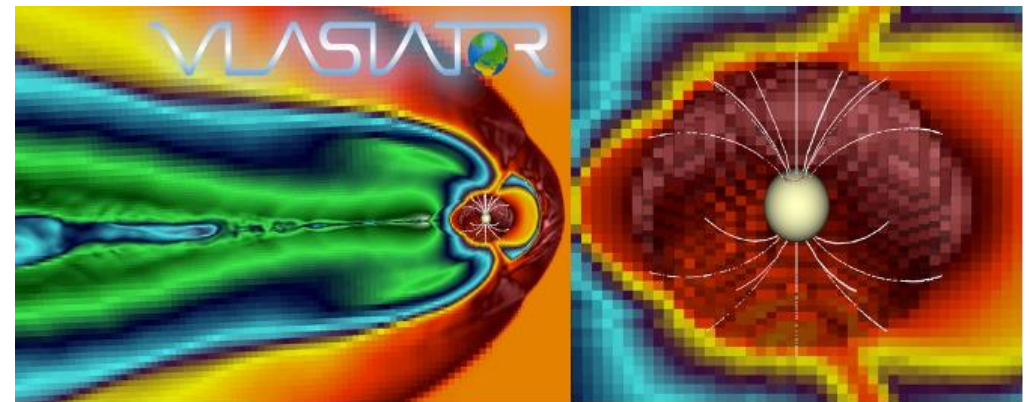
<https://github.com/ComputationalRadiationPhysics/picongpu>

BIT



<https://repo.tok.ipp.cas.cz/tskhakaya/bit1>

Vlasiator



<https://github.com/fmihpc/vlasiator>

GENE Scaling

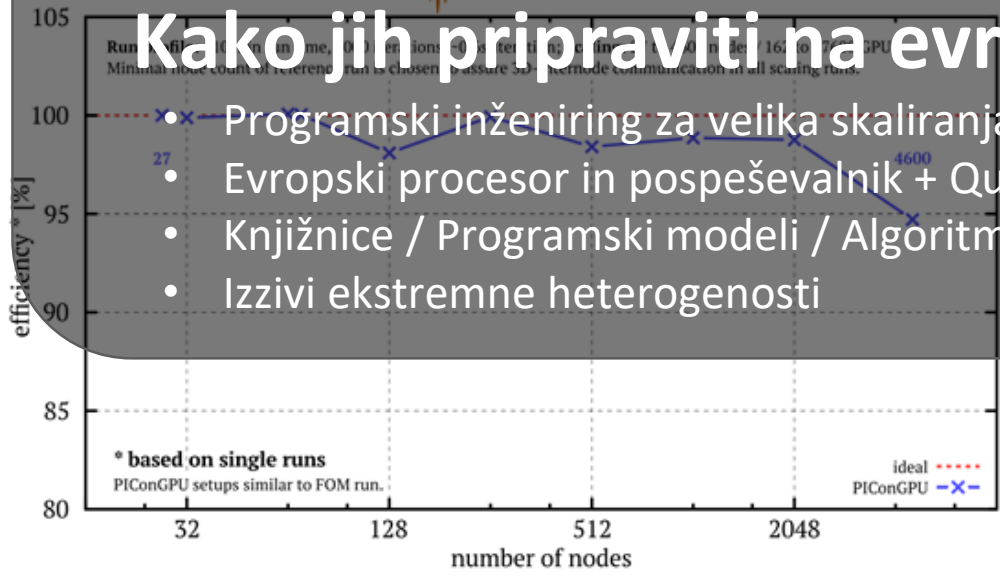


Vlasiator - strong scaling - Mahti (CSC)



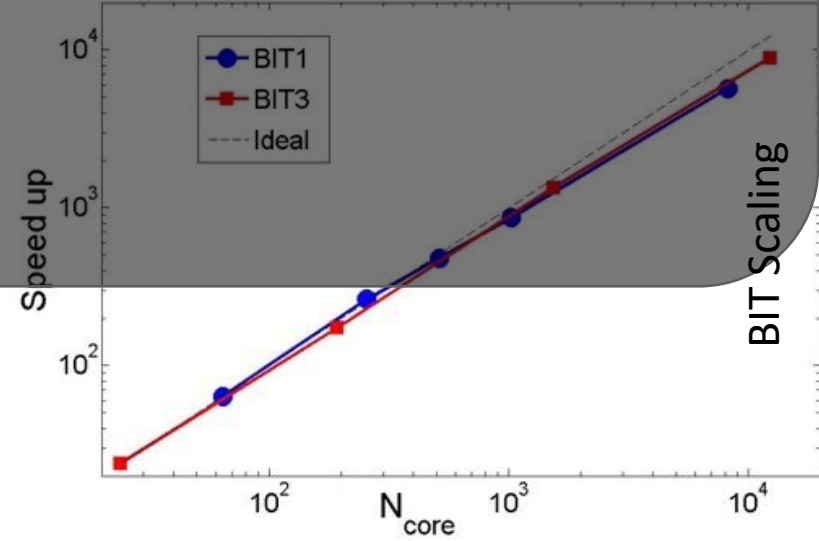
Fokusiranje na izjemne plazemske kode za katere je dokazano skaliranje natrenutnih peta-ravenskih sistemih

PIConGPU Scaling



Kako jih pripraviti na evropske eksa-ravenske sisteme?

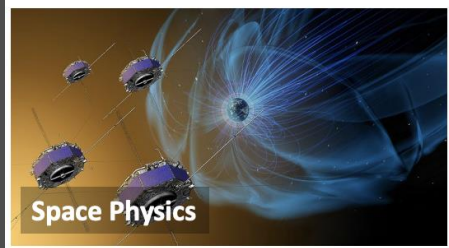
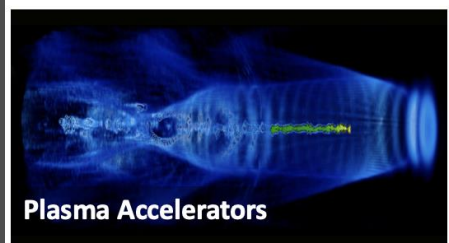
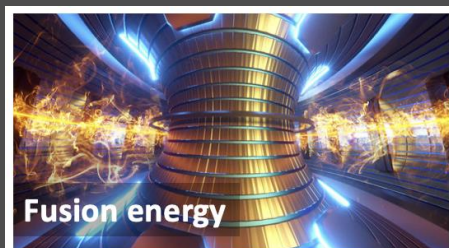
- Programski inženiring za velika skaliranja kode
- Evropski procesor in pospeševalnik + Quantum
- Knjižnice / Programski modeli / Algoritmi
- Izzivi ekstremne heterogenosti



Pet tehničnih delovnih področij



WP1 - Simulacije plazme – kode in veliki izzivi



WP2 - Sooblikovanje simulacijskih kod plazme z Evropskim procesorjem in pospeševalnikom

- EPI Processor
- EPI Accelerator
- Quantum Computing

WP3 - Algoritmi in knjižnice za simulacije plazme ekstremnega obsega

- MPI
- Load-balancing
- Resilience & Fault-tolerance

WP4 - Ekstremna podatkovna analitika za simulacije plazme

- Parallel I/O
- In-situ data analysis
- Compression

WP5 - Pospešene plazemske simulacije na heterogenih sistemih

- Redesigning Algorithms, Porting, and Optimization for Accelerators
- Application Data Placement and Migration for Heterogeneous Memories

Naslov



Naslov



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Hvala!



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