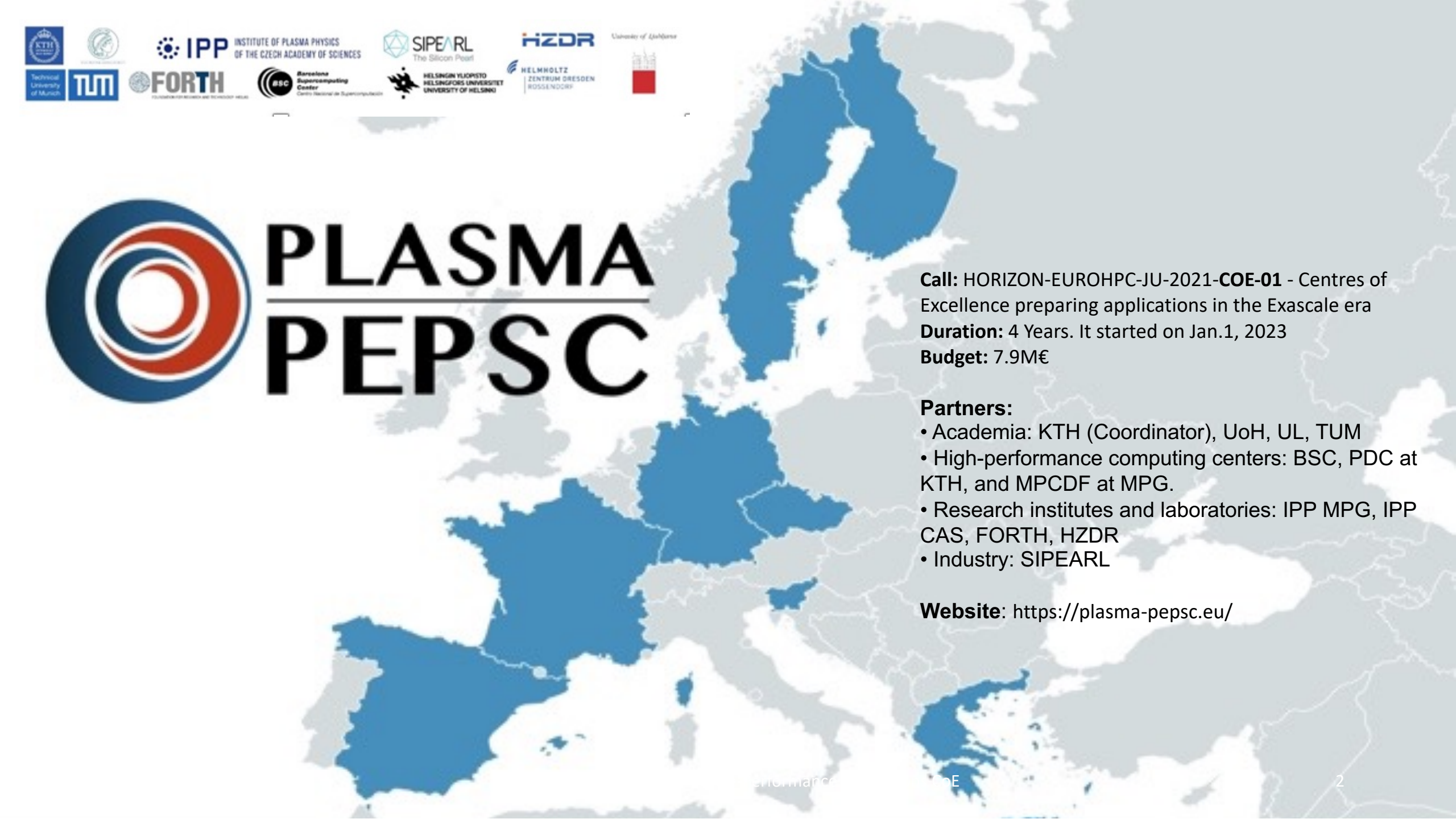
# PLASMA PEPSC

**https://plasma-pepsc.eu/**

Plasma-PEPSC
*Plasma Exascale-Performance Simulations CoE*
*EECS 2023*

Stefano Markidis
Coordinator

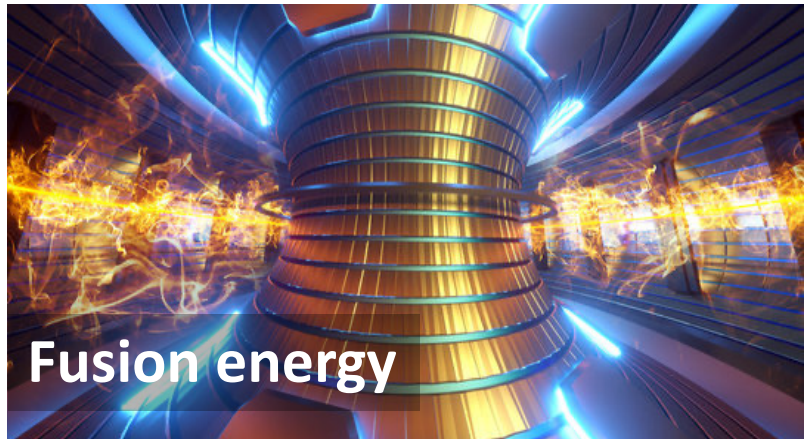


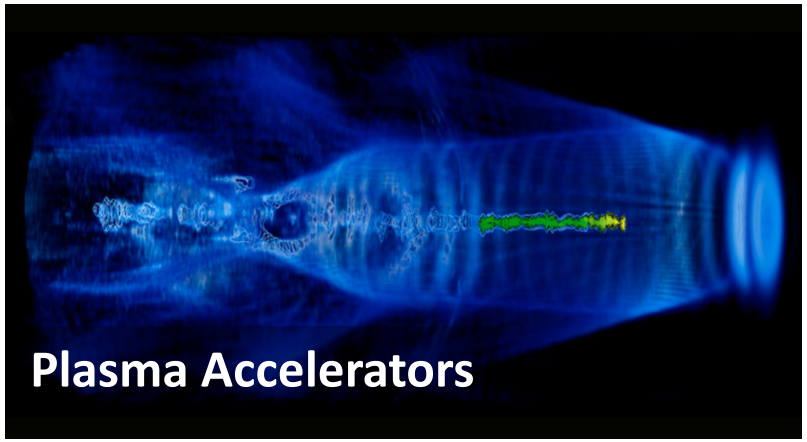
# PLASMA PEPSC

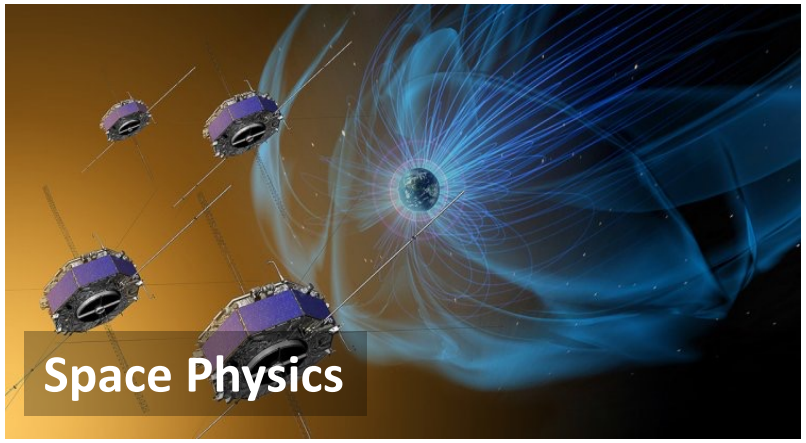
**Call:** HORIZON-EUROHPC-JU-2021-**COE-01** - Centres of Excellence preparing applications in the Exascale era
**Duration:** 4 Years. It started on Jan.1, 2023
**Budget:** 7.9M€

**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/



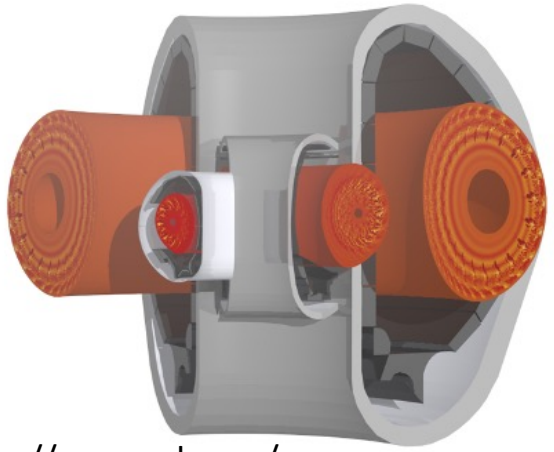




# Plasma-PEPSC Vision:

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

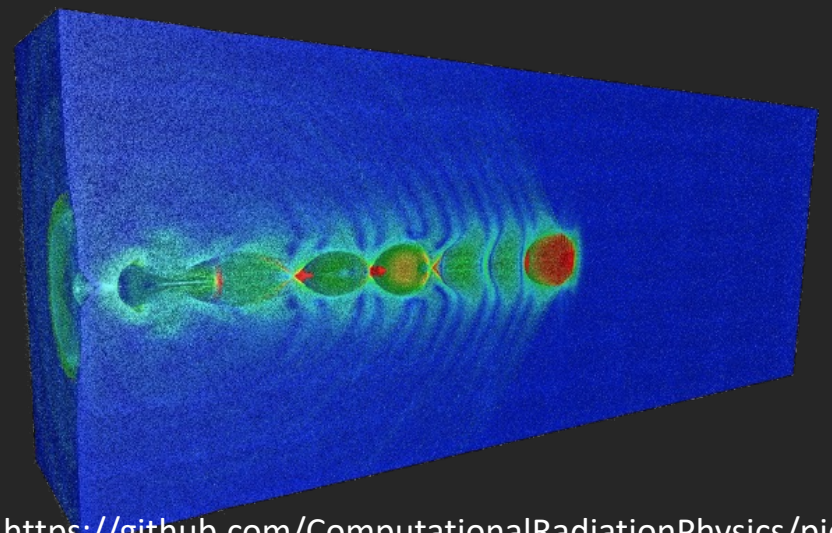
# Plasma-PEPSC Flagship Codes

## GENE / GENE-X



https://genecode.org/

## PIConGPU

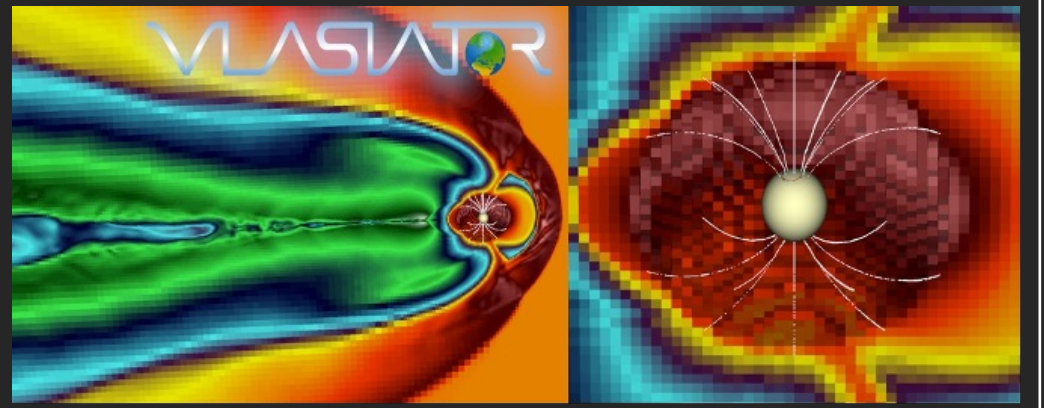


https://github.com/ComputationalRadiationPhysics/picongpu

## BIT

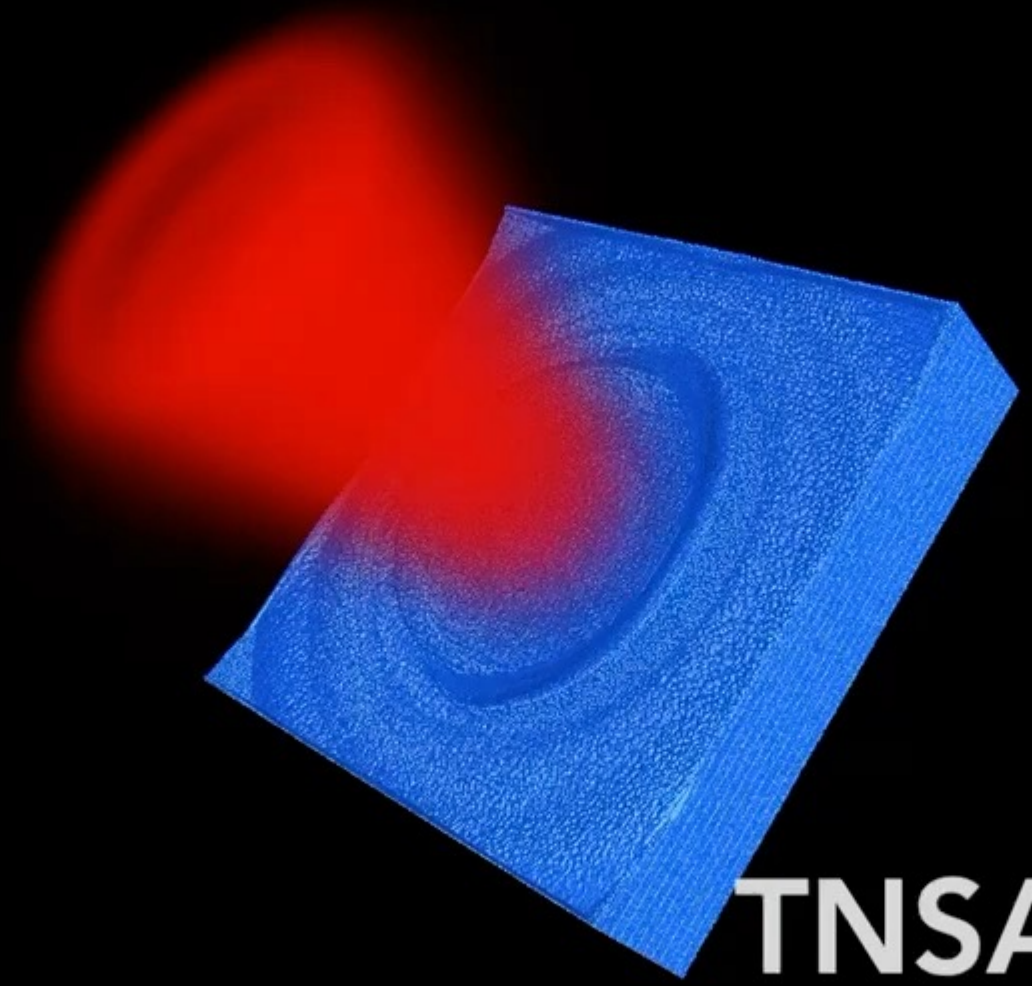
https://repo.tok.ipp.cas.cz/tskhakaya/bit1

## Vlasiator




https://github.com/fmihpc/vlasiator

PIConGPU
ISAAC



# TNSA

## TARGET NORMAL SHEATH ACCELERATION

# Sustainable Development Goals

- **Alignment with SDGs:**
  - Plasma-PEPSC's mission aligns with several Sustainable Development Goals, including:
    - SDG 7: Affordable and Clean Energy
    - SDG 9: Industry, Innovation, and Infrastructure
    - SDG 13: Climate Action
- **Environmental Impact:**
  - The simulations conducted by Plasma-PEPSC are designed to optimize processes crucial for sustainable development, such as:
    - Efficiently controlling plasma-material interfaces reduces energy consumption and waste in materials.
    - Fusion plasma optimization contributes to the development of clean and limitless energy sources.
- **Global Collaboration:**
  - Plasma-PEPSC actively collaborates with international partners, promoting global cooperation to address shared sustainability challenges.

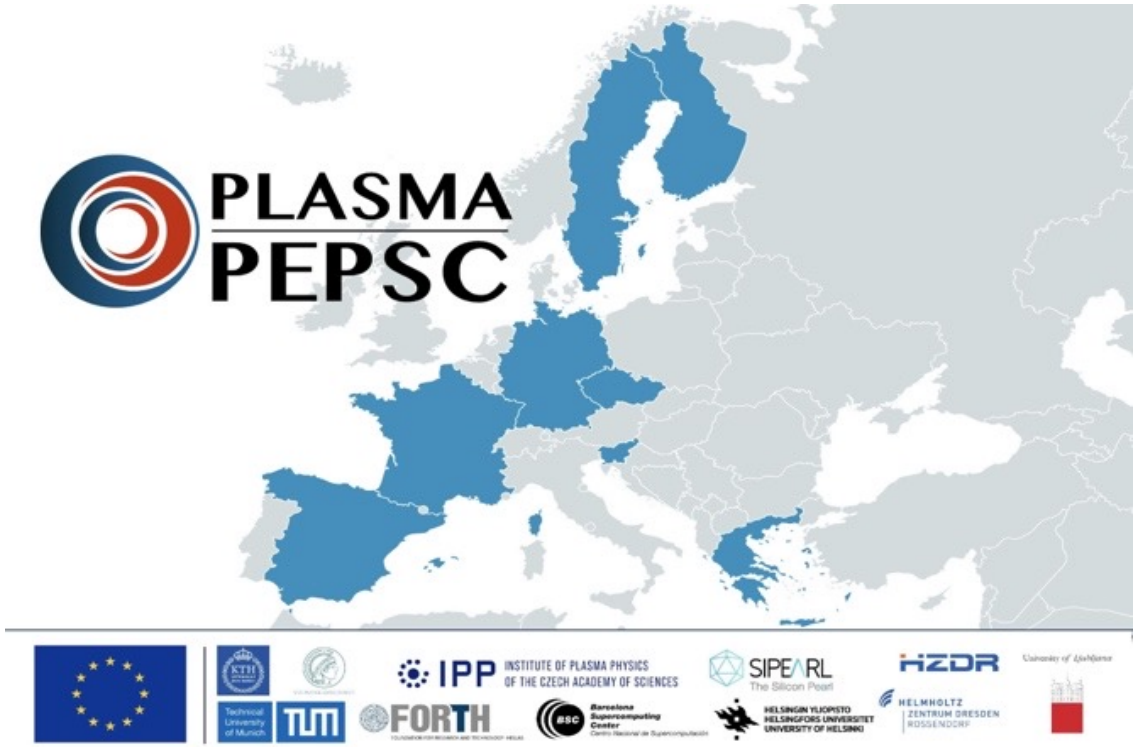
# Sustainability Impact

- **Transformative Potential:**
  - Potential revolutionize the energy landscape and health industry (radiation therapy)
- **Clean Energy Innovation:**
  - Plasma-PEPSC's work contributes to the development of innovative clean energy solutions, particularly in the area of fusion plasmas.
- **Space Exploration:**
  - Beyond Earth, Plasma-PEPSC's simulations aid in predicting and understanding space plasma dynamics, enhancing our ability to sustainably explore outer space.

# Community Standard

- **Knowledge Sharing:**
  - Plasma-PEPSC strives to establish a community standard for plasma science simulations.
- **Cross-Disciplinary Collaboration:**
  - The community standard encourages cross-disciplinary collaboration by providing a common language and framework for researchers in different fields.
- **Educational Impact:**
  - By setting a community standard, Plasma-PEPSC contributes to the education and training of the next generation of scientists and engineers.

# Acknowledgments

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EuroHPC Joint Undertaking

PLASMA PEPSC