

EUROPEAN
PLASMA RESEARCH
ACCELERATOR WITH
EXCELLENCE IN
APPLICATIONS



WP8 – Theory and simulations

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EuPRAXIA PP kick-off meeting



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Working group 8

Plasma

Conventional accelerators

Lasers

Free electron lasers

Simulation and theory development

- Centralize information about codes available, their features, and applicability
- Assess theory and simulation needs

Research activities updates

- Report on new conceptual developments of relevance for EuPRAXIA
- Updates on numerical modelling of supporting experiments that may be performed during the preparatory phase

Theory and simulations for user facility

- Define excellence centre structure for theory and simulations

Institute	Expertise	Contribution PMs
IST (lead)	Plasma acceleration	72
CEA (co-lead)	Plasma acceleration	37
INFN	Conventional acceleration, plasma acceleration, FELs	6
CNR	Laser physics, plasma acceleration	4
CNRS	Plasma acceleration, laser physics	22
DESY	Plasma acceleration, conventional acceleration, Laser physics, FEL	6
ELI	Plasma acceleration, laser physics	24
CLPU	Laser physics	2
UCLA	Plasma acceleration, conventional acceleration, FEL	6

Connections with other work packages

- **WP4** – Financial & Legal model
- **WP7** – e-data needs
- **WP14** – Transformative innovation paths

Milestones

- MG.1 Update of concepts for EuPRAXIA, system status report (M24)

Deliverables

- D8.1 Report on structures to be funded from national/bilateral/European level for simulation and theory (M12)
- D8.2 Report on results achieved in the field of theory and simulations (M24)
- D8.3 Report on status of EuPRAXIA simulated performances (M46)



- Platform for coordination, collaboration, scientific and technical exchange
- Coordination efforts for code development and integration
- Front end for the EU exascale initiatives on plasma accelerators
- Hub for novel and disruptive ideas, and to explore future directions for the EuPRAXIA facility.



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Several Centers of Excellence in Europe involving HPC are good starting point to precisely define a theory and simulation Center of Excellence for EuPRAXIA

- Define the area of contributions for every participant (this is a multidisciplinary project, involving many different disciplines) to effectively coordinate all theory and simulation advance.
- Organize virtual meetings/information exchange to discuss the multiple advance in theory and simulations
- Precisely define the structure of Centre of Excellence for theory and simulations