

EUROPEAN
PLASMA RESEARCH
ACCELERATOR WITH
EXCELLENCE IN
APPLICATIONS



ENEA interests

WP9 – RF, Magnets & Beamline Components

F. Nguyen for the ENEA group on FELs & Undulators

1st Meeting on March 15th 2023



This project has received funding from the European Union's Horizon
Europe research and innovation programme under grant agreement
No. 101079773

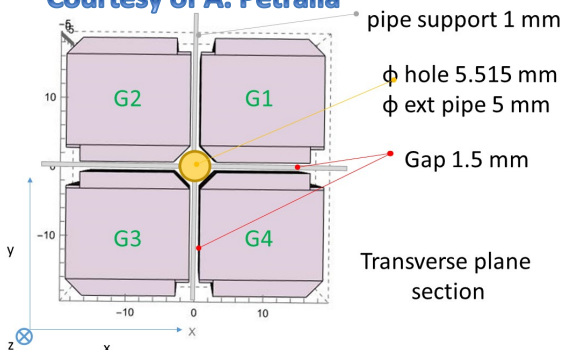
EuPRAXIA INFRADEV-H2020-2014-1 (2015-19)

ENEA as deputy leader of the **FEL Pilot Experiments** →
largely contributed to the **FEL performance** in the **CDR**

EuPRAXIA@SPARC_LAB

FEL user facility @ $\lambda \sim 3-5$ nm (water window)
Operating at 1 GeV e-beam energy

Courtesy of A. Petralia



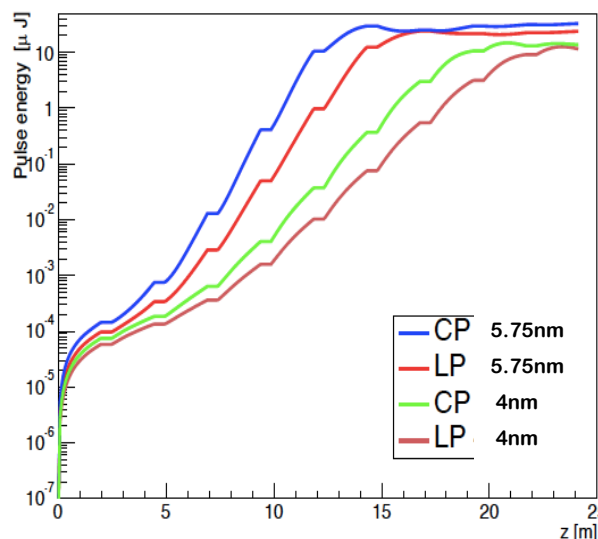
- NdFeB
- Circ./Linear pol.
- $\lambda_u = 18$ mm
- Br 1.35 T
- Min gap 1.5 mm
- Kmax 1.15 (CP), 1.6 (LP)
- Length 2m ($110 \times \lambda_u$)
- 10 modules
- out of vacuum



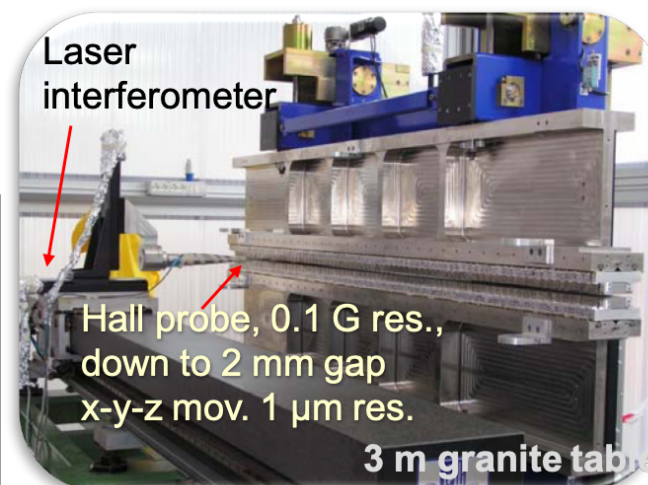
Article

Free Electron Laser Performance within the EuPRAXIA Facility

Federico Nguyen ^{1,*}, Axel Bernhard ², Antoine Chancé ³, Marie-Emmanuelle Couprie ⁴,
Giuseppe Dattoli ¹, Christoph Lechner ⁵, Alberto Marocchino ⁶, Gilles Maynard ⁷,
Alberto Petralia ¹, Andrea Renato Rossi ⁸



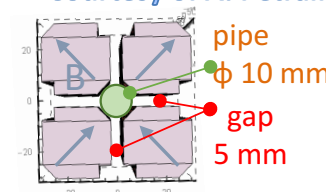
Magnetic field measurement: instrumentation upgrade



SABINA Italian Regional call

Source of Advanced Beam Imaging for Novel Appl.

Courtesy of A. Petralia



- NdFeB
- Circ./Linear pol.
- $\lambda_u = 55$ mm
- Br 1.22 T
- Kmax 3.4 (CP), 4.8 (LP)
- Length 1.35m ($22 \times \lambda_u$)

Interests and contribution area: full undulator section, incl. magnets & other components

Expectations: consolidate world wide efforts on novel variable polarization short period undulators for reduced footprint FEL facilities