EuPRAXIA e l'accelerazione al plasma

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Feb 2016 - Jan 2020	Ph.D. grant, Summa cum Laude	Instituto Superior Técnico, Universidade de Lisboa Central Laser Facility (CLF), Rutherford Appleton Laboratory, Oxford Laboratori Nazionali di Frascati (LNF), INFN	Ph.D. student in Technological Physics Engineering	Thesis Title: High contrast front-end for petawatt laser system designed for electron acceleration & High intensity laser-matter applications towards advanced compact particle accelerators
04/20 – 12/21	PostDoc grant	LNF, INFN	PostDoc Researcher	Research interests: laser-driven electron/ion acceleration and secondary EM radiation, particle-driven plasma acceleration, FEL, radiation-particle and plasma diagnostics, with a preferred focus on experimental and numerical investigations.
12/21 – ongoing	RTdA contract	University of Tor Vergata	Researcher	

Accelerator related activities @ TOV

Sergio Tazzari (1936-2020)

Luciano Catani

Alessandro Cianchi
Head Diagnostics EuPRAXIA

Diagnostics and Controls

Francesco Stellato
Head Users EuPRAXIA

Mario Galletti

Francesco Demurtas
(MsC student)

Lasers, FELs and radiation applications

Enrica Chiadroni
(LNF->Sapienza)

Barbara Marchetti
LNF->Desy

Riccardo Pompili
LNF

LEFT

Mauro Sbragaglia

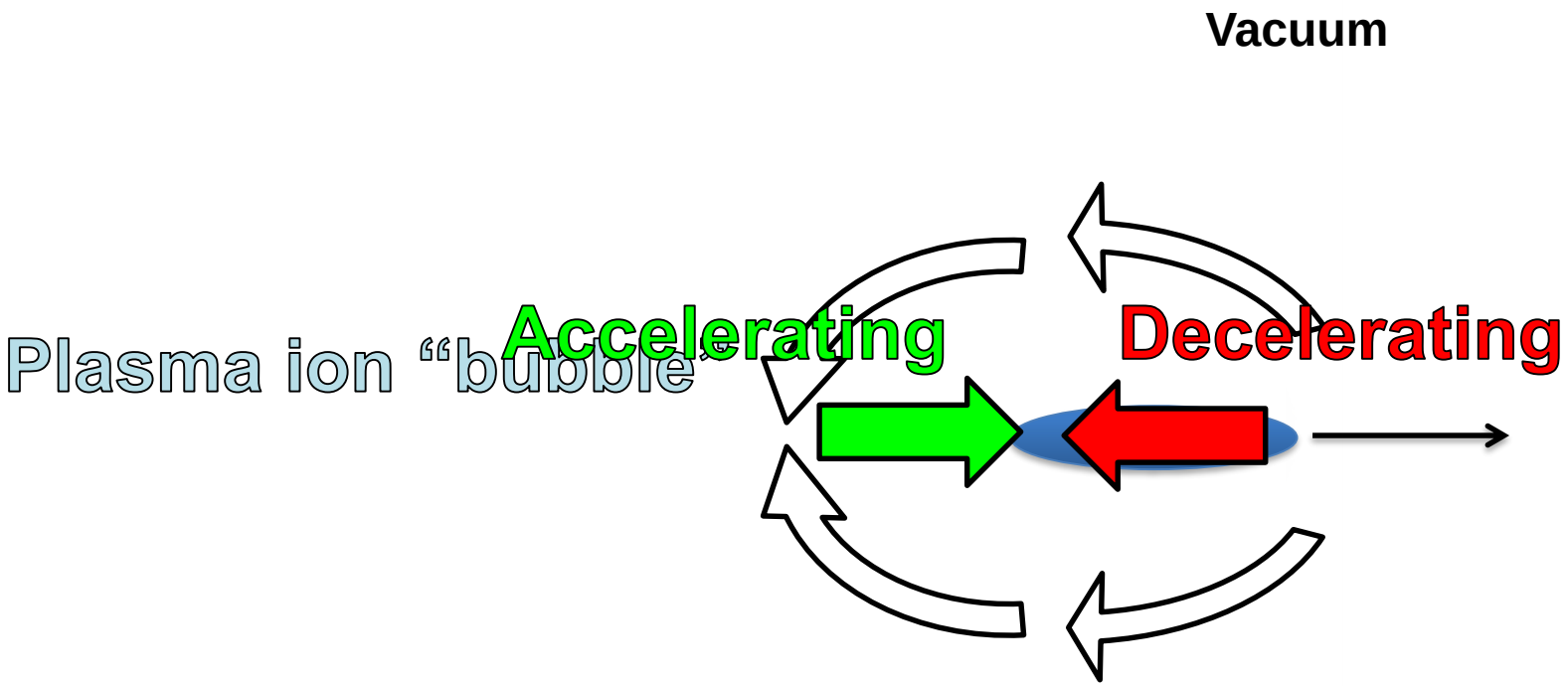
Fabio Guglietta

Daniele Simeoni

Gianmarco Parise
(PhD student)

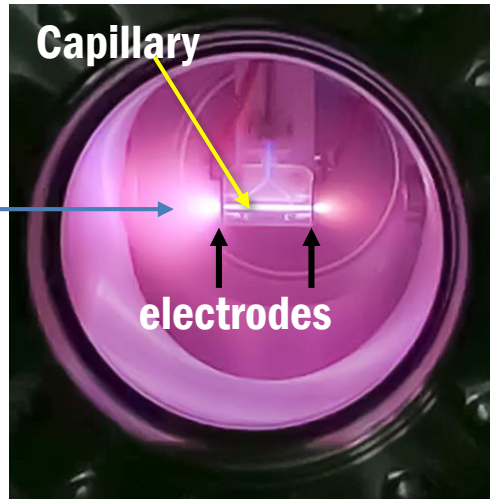
CFD (computational fluid dynamics) for plasma acceleration

Plasma acceleration



Accelerating structure

- Plasma inside a capillary
- HV discharge to ionize the gas



Discharge

Electric field strength

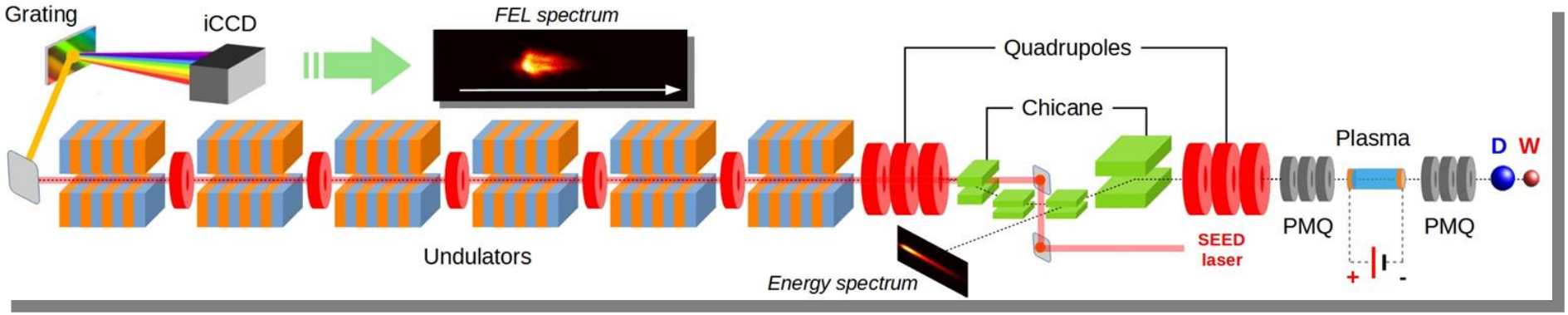
$$E \approx (96\ \mathrm{V/m}) \sqrt{n_e[\mathrm{cm}^{-3}]}$$

e.g. E ≈ 100 GV/m (for $n_e \approx 10^{18}$ cm^{-3})

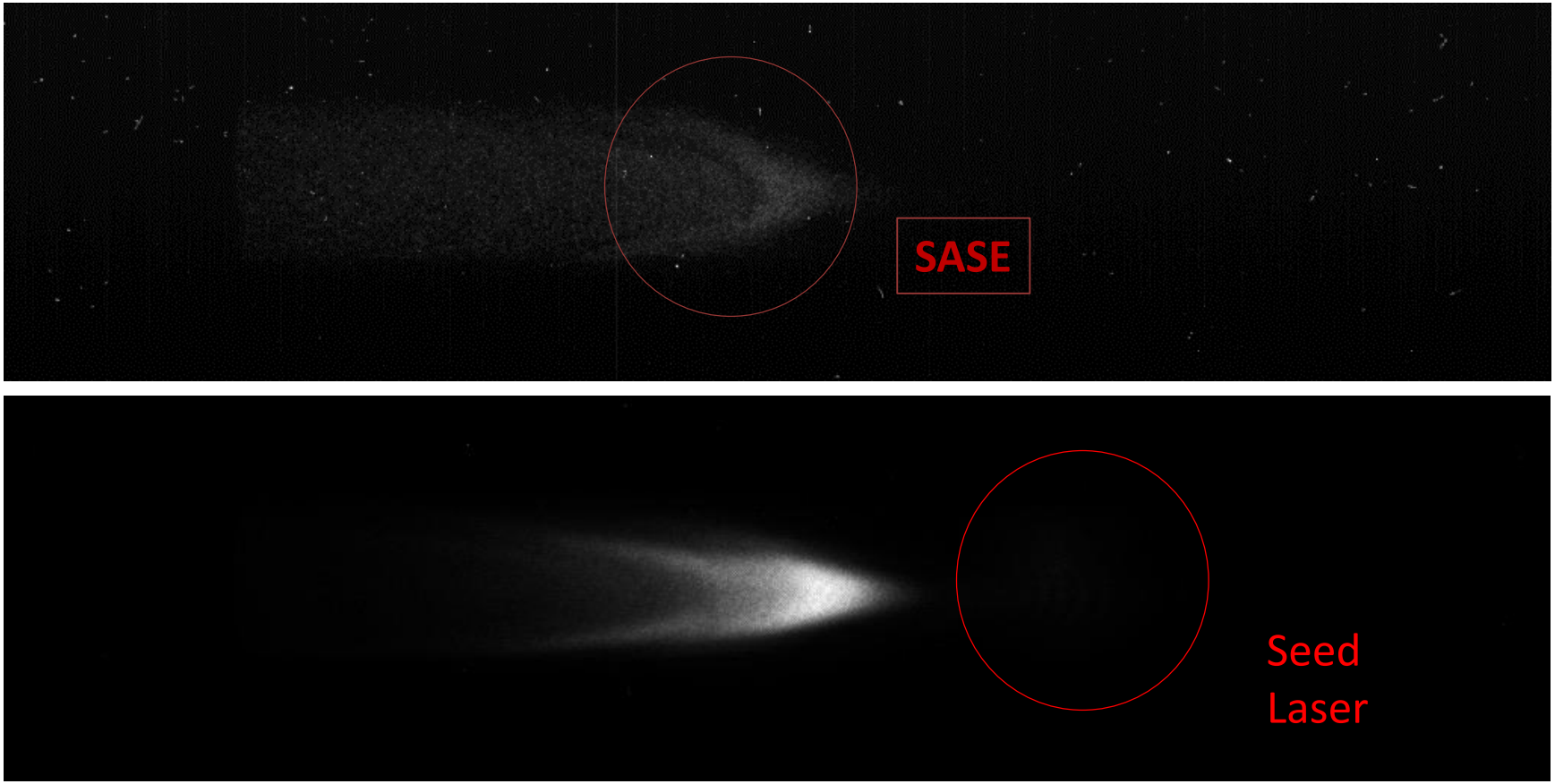
EuPRAXIA@SPARC_LAB

- **Beam instrumentation**
- **Radiation sources**
- **Lasers**

Laser setup for seeding

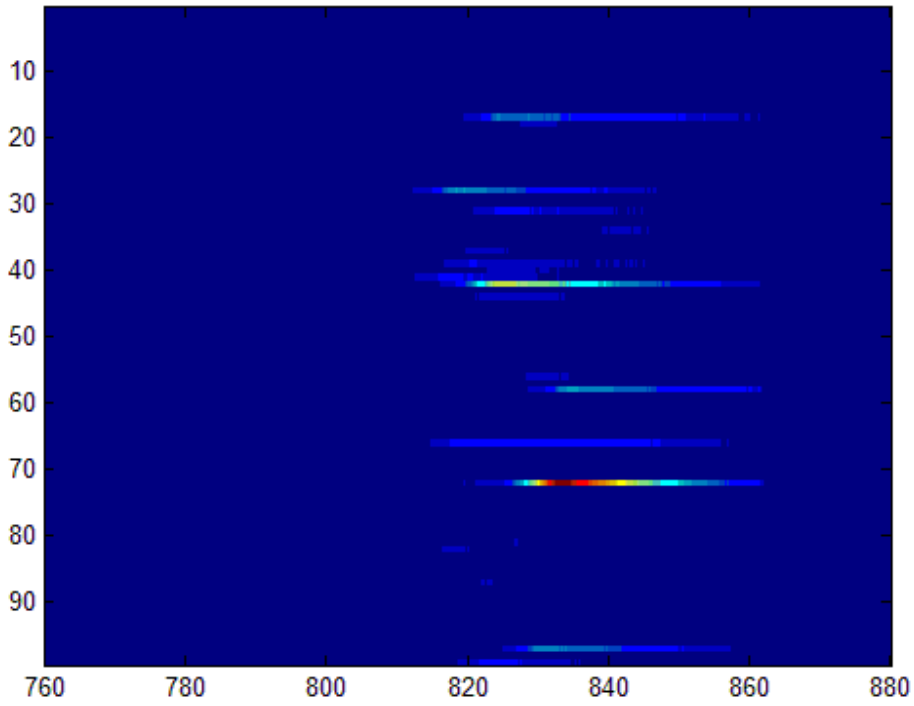


FEL seeded vs SASE spectrum



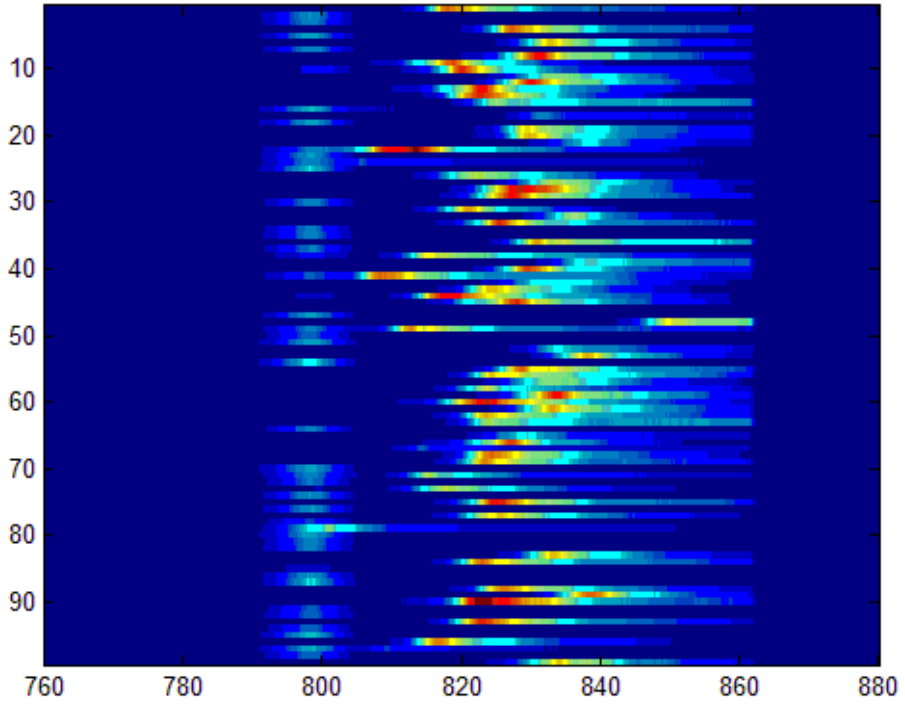
FEL seeded vs SASE spectrum

- **SASE**



- *Wavelength_av* ~ 827 nm
- *FWHM_av* ~ 8 nm

- **SEEDING**



- *Wavelength_av* ~ 829 nm
- *FWHM_av* ~ 8 nm

FEL seeded vs SASE spectrum