



Contribution ID: 59

Type: **not specified**

High Repetition rate Plasma sources

Thursday, 26 September 2024 16:00 (30 minutes)

In view of the realization of the EuPRAXIA@SPARC LAB facility, designed to operate a plasma-driven FEL source at 100-400 Hz, the capability of plasma sources to operate at high repetition rates plays a key role. Concerning gas-filled plasma discharge capillaries, which allow direct control over plasma properties, a crucial aspect is related to the longevity of the material, exposed to the heat flux delivered by high voltage plasma discharges. In this regard, the innovative design of gas-filled discharge capillaries, based on the use of ceramic materials, represents a reliable solution in terms of high temperature resistance and cost-effectiveness. In addition, a suitable option for high repetition rate plasma sources is given by laser-induced plasma filaments, which can sustain high repetition rate operation without material overheating, due to the low thermal load delivered onto the capillary walls by few-mJ femtosecond laser pulses. Furthermore, plasma filaments are characterized by high stability and tunable parameters, such as filament length and density, thus meeting the requirements outlined in the EuPRAXIA scientific case.

Primary author: CRINCOLI, Lucio (Istituto Nazionale di Fisica Nucleare)

Co-authors: BIAGIONI, Angelo (Istituto Nazionale di Fisica Nucleare); PELLEGRINI, Donato (Istituto Nazionale di Fisica Nucleare); VILLA, Fabio (Istituto Nazionale di Fisica Nucleare); VERRA, Livio (Istituto Nazionale di Fisica Nucleare); PRONTI, Lucilla (Istituto Nazionale di Fisica Nucleare); Mr PITTI, Marco (Università di Palermo); GALLETTI, Mario (Istituto Nazionale di Fisica Nucleare); ROMANI, Martina (Istituto Nazionale di Fisica Nucleare); FERRARIO, Massimo (Istituto Nazionale di Fisica Nucleare); Dr POMPILI, Riccardo (Istituto Nazionale di Fisica Nucleare); DEMITRA, Romain (Istituto Nazionale di Fisica Nucleare); LOLLO, Valerio (LNF)

Presenter: CRINCOLI, Lucio (Istituto Nazionale di Fisica Nucleare)