



Contribution ID: 36 Contribution code: TUP10

Type: **Poster Presentation**

Optical diagnostic studies of the electron cyclotron resonance plasma produced in the GTS-LHC ion source

Tuesday, September 17, 2024 5:00 PM (1h 30m)

The GTS-LHC electron cyclotron resonance (ECR) ion source is an integral part of the chain of accelerators at CERN. It produces the heavy ion beams which are accelerated using a series of accelerators from LINAC up to the LHC. The ion beams are extracted from an ECR plasma generated at the GTS-LHC ion source, however, there has not yet been a non-invasive diagnostic device to study the plasma. This research focuses on the implementation of an optical diagnostics and studies the optical emission spectra (OES) as a monitor of the performance of the ion source. Furthermore, we explore the correlation between spectral properties and changing source parameters, offering insights into the behaviour of the ion source, which in turn helps in fine-tuning of the source. Specifically, the study concentrates on long-term OES analysis spanning several weeks, focusing on the production of magnesium and lead ions using the GTS-LHC ion source.

Footnotes

Funding Agency

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Yes

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Session Classification: TUP: Poster Session

Track Classification: MC6: Applications and Diagnostics