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## Characterization of the ECR ion source LEGIS extraction system and its low energy beam transport line at Legnaro National Laboratories

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At INFN-Legnaro National Laboratories the heavy ions accelerator complex is fed with beams produced by a permanent magnet ECR source called LEGIS (LEGNaro ecrIS). Although suitable intensities and charge states to fulfil the requests of the users are normally guaranteed, the first part of the Low Energy Beam Transport line (LEBT) downstream of the ion source suffers from non-negligible losses and a lack of scalability when switching between ions with different mass-to-charge ratios, thus leading to a machine preparation time longer than would be desirable. These criticalities called for a deep characterization of the beam coming out from the ion source, especially in the case of high charge states heavy ions production, normally showing the lowest intensities. This contribution describes the numerical studies performed on the extraction system of the LEGIS source and its LEBT. The physics case used is a  $^{208}\text{Pb}^{31+}$  beam produced for a nuclear physics experiment in fall 2022. As will be shown, the results shed light on the reasons for the bad reproducibility and transmission, mostly due to aberrations induced on the extracted beam by the first optical elements.

### Footnotes

### Funding Agency

### I have read and accept the Privacy Policy Statement

Yes

**Primary author:** MASCALI, Giada Rachele (Sapienza University of Rome)

**Co-authors:** BELLAN, Luca (Istituto Nazionale di Fisica Nucleare); GALLO, Carmelo Sebastiano (Istituto Nazionale di Fisica Nucleare); MARTINI, Denis (Istituto Nazionale di Fisica Nucleare); FRANCESCON, Paolo (Istituto Nazionale di Fisica Nucleare); COMUNIAN, Michele (Istituto Nazionale di Fisica Nucleare); CARLETTO, Osvaldo (Istituto Nazionale di Fisica Nucleare); GALATÀ, Alessio (Istituto Nazionale di Fisica Nucleare)

**Presenter:** MASCALI, Giada Rachele (Sapienza University of Rome)

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