



Contribution ID: 153

Type: **Poster ARD**

iLIGHT - Laser Accelerated Ions in the SIS18

Monday 3 November 2025 18:55 (3 minutes)

The Laser Ion Generation, Handling and Transport (LIGHT) beamline at GSI forms part of the ATHENA distributed facility, which is primarily concerned with the manipulation of phase space in laser-generated ion beams. In recent years, the LIGHT collaboration has achieved the routine generation and focusing of intense 8 MeV proton bunches with a temporal duration shorter than 1 ns (FWHM).

In numerous accelerator facilities, linear accelerators are employed to accelerate ions to several MeV, which can then be injected into a synchrotron for post-acceleration. Given that high-power laser systems can also be employed to provide ions with such energies via target normal sheath acceleration (TNSA), it is conceivable that they could serve as an alternative ion source for synchrotrons in the future, particularly if the repetition rates of advanced laser systems align with those of linear accelerators. This concept has the potential to reduce the injection time, provide ion beams with lower emittances, and reduce the cost and size of future accelerator facilities.

However, since the initial TNSA-generated ion beam typically exhibits a high energy spread and a large initial divergence, it is necessary to adjust the beam to obtain a sufficient number of particles within the acceptance range of the synchrotron. In this regard, conventional accelerator structures may be employed, as exemplified by the Laser Ion Generation, Handling and Transport (LIGHT) beamline. The laser-driven beamline is situated at GSI in close proximity to the transfer channel between the Universal Linear Accelerator (UNILAC) and the Heavy Ion Synchrotron SIS18, which renders this experimental area optimal for a preliminary proof-of-principle experiment.

With this poster, I will first describe the setup and working principle of the LIGHT beamline. I will then summarize the capabilities of the LIGHT beamline and the current status of ongoing projects, with a particular focus on the injection of LIGHT protons into GSI's Heavy Ion Synchrotron SIS18.

Speed talk:

Normal speed talk selection

Author: NAZARY, Haress (GSI / TU Darmstadt)

Presenter: NAZARY, Haress (GSI / TU Darmstadt)

Session Classification: Poster