

# The 13th International Conference on Stopping and Manipulation of Ions and related topics (SMI-2019)



Contribution ID : 15

Type : **not specified**

## Development of a New Laser Ablation Ion Source

*Thursday, 18 July 2019 14:20 (20)*

A new laser ablation ion source is under development at the Institute for Nuclear Physics, TU Darmstadt for high-precision collinear laser spectroscopy. The design will combine the versatility of laser ablation ion production and the non-conservative cooling in Helium buffer gas, to produce a low emittance ion beam of a wide range of elements. It is based on the original idea of an RF-only ion funnel [1] using only the gas jet to transport the ablated ions, which are radially confined by RF electrodes. Additionally, this design will contain a new feature that will allow to further cool and bunch the ion beam. For this purpose, an additional RF electrode stack is placed in the next pumping stage superimposed by a DC gradient towards the exit [2]. The last electrode can be connected to a positive voltage to create a potential barrier and stop the ions to produce a narrow ion bunch. Detailed computer simulations have shown that this ion source [3] will allow us to produce various high-quality continuous and pulsed ion beams, with low transverse and longitudinal emittance. We will present the current status and first results of this project development.

[1] Victor Varentsov, A new Approach to the Extraction System Design, SHIPTRAP Collaboration Meeting, 19 March, 2001, DOI: <https://doi.org/10.13140/RG.2.2.30119.55200>

[2] Victor Varentsov, Proposal for a new Laser ablation ion source for LaSpec and MATS testing, NUSTAR Collaboration Meeting, 1 March, 2016, DOI: <https://doi.org/10.13140/RG.2.2.10904.39686>

[3] T. Ratajczyk, V. Varentsov and W. Nörtershäuser, Status of a new laser ablation ion beam source for LASPEC, GSI-FAIR SCIENTIFIC REPORT 2017, DOI: <https://doi.org/10.15120/GR-2018-1>

**Primary author(s)** : RATAJCZYK, Tim (TU Darmstadt, Institut für Kernphysik, Darmstadt, Germany); Prof. VARENTSOV, Victor (Facility for Antiproton and Ion Research in Europe (FAIR GmbH), Darmstadt, Germany; 3 Institute for Theoretical and Experimental Physics, Moscow, Russia); Mr BOLLINGER, Philipp (TU Darmstadt, Institut für Kernphysik, Darmstadt, Germany); Mr LELLINGER, Tim (TU Darmstadt, Institut für Kernphysik, Darmstadt, Germany); Prof. NÖRTERSCHÄUSER, Wilfried (TU Darmstadt, Institut für Kernphysik, Darmstadt, Germany)

**Presenter(s)** : RATAJCZYK, Tim (TU Darmstadt, Institut für Kernphysik, Darmstadt, Germany)