

# MATS-LaSpec Meeting at NUSTAR Week

GSI, March 1<sup>st</sup>, 2016

Participants: (to add more)

Zoran Andelkovic, Iain Moore, Jörg Krämer, Hans Geissel, Wolfgang Plaß, Timo Dickel, Alexander Herlert, Michael Block, Wilfried Nörtershäuser, Victor Varentsov, Sergey Elisseev, Klaus Blaum, Frank Herfurth, Peter Thierolf, Yuri Novikov

## 1. Welcome

Given by M. Block and summarizing the items to be presented at the meeting.

## 2. Organizational issues

Following the vote within the LaSpec community it was made official that I. Moore will become the Spokesperson of LaSpec and W. Nörtershäuser will move to Deputy Spokesperson.

It was proposed and agreed that due to the need for swift movement towards the Low Energy Branch layout of MATS-LaSpec, Zoran Andelkovic will become the Technical Director of MATS and LaSpec. Frank Herfurth will be the Project Manager for MATS, and Jörg Krämer the Project Manager for LaSpec.

## 3. Presentation by V. Varentsov on a "Proposal of a new laser ablation source for LaSpec and MATS testing"

Presentation based on an RF-only gas cell-based laser ablation source. Introduction to a similar system in use by the EXO collaboration for the  $0\nu\beta\beta$  decay experiment of Xe into Ba. Gas flow simulations detailed, transmission efficiencies and expected energy spreads. Plenty of discussion however it is clear that such a device is not for on-line purposes however could be foreseen as an off-line ion source.

## 4. Presentation of the status and update of the LEB building layout (Zoran Andelkovic)

The slides will be made available. The layout of the MATS and LaSpec beam lines were discussed in light of the available floor space. A 40 m<sup>2</sup> laser laboratory is available as well as a 20 m<sup>2</sup> general purpose room for MATS and LaSpec. MATS will be kept on the ground floor. If feasible within the cost cap a second floor platform is kept as an option.

## 5. Presentation on the integration of the cryogenic stopping cell (CSC) within the LEB building (Wolfgang Plaß)

Firstly a general overview of the LEB layout: the mono-energetic degrader will be position in the FLF5 area. A degrader will be required at FLF6 for final slowing down before entering the CSC, as well as a MUSIC detector. These devices are not within the accelerator costbook.

Secondly, the motivation for the design of the new CSC was given. The current design is limited by the stopping efficiency and areal density. A two-stage chamber will be built, with a total length of 2 m (currently 1 m) × 0.2 m, with vertical extraction between a high pressure

chamber and a lower pressure chamber through a number of RF carpets. This will allow for the application of higher electric fields. It is expected that an enhancement in performance will be achieved through 1. extremely short extraction times, 2. higher rate capability, 3. increased areal density, 4. minimized RF power, 5. improved cleanliness.

The foreseen output to the beamline from the CSC will be at a height of 2m. This is compatible with the beamline height at the S-FRS.

The cost estimate for the new CSC includes an overall budget of ~2Meuros.

The conceptual design of the new CSC has recently been published as a contribution to the EMIS 2015 conference:

<http://dx.doi.org/10.1016/j.nimb.2016.01.015>

The existing CSC is under off-line testing at S4 with a shorter DC electrode cage resulting in higher field strengths. Typical extraction times using  $\alpha$ -recoil sources have shown to be a few ms. A recent measurement mass measurement using the MR-TOF-MS of  $^{215}\text{Po}$  (a daughter in the radioactive decay chain of  $^{223}\text{Ra}$ ) which has a half-life of only 1.781ms has been made, with an accuracy of  $5 \times 10^{-7}$  expected. Using mass-selected decay spectroscopy (using a Bradbury-Nielson gate for selection) a half-life measurement of 1.776ms agrees well with the literature value.

Beam time at GSI in May/June 2016 will be used to continue developments with the current CSC. Planned tests include the stopping and extraction of lower mass projectile fragments, testing the cleanliness of the CSC, testing the rate capability of the RF carpet. One issue to note is the expected lower beam energies available at the FRS and therefore how to identify the fragments.

#### 6. Presentation on administrative issues (Alex Herlert)

Regarding the PSP codes for the LEB infrastructure, 1.2.1.1 (slow beamline) has 0% secured funding, while 1.2.1.2 (stopping cell) has 59% secured funding. The psp code 1.2.1.3 (laser ion source) is no longer "active" however can be reactivated in the future if needed.

The first batch of investment funding for Giessen from BMBF has been approved for the gas cell; 195 keuros in 2016.

Within LaSpec, psp code 1.2.4.5 (RILIS) was submitted to the FAIR Council and is thus a 100% in-kind contribution from Finland. The RFQ will be submitted to the Council in the future once final decisions have been made within the collaboration related to the HV operation of beamlines and so forth.

Regarding the HV options, an updated overview will be distributed in the near future by Frank and Wolfgang. As many members of the community will meet in Poznan in May, it has been decided to discuss the options at that time. Final decisions will then be made at the time of the NUSTAR meeting in York, UK in the fall. This will be done in time for the TDR submission towards the end of the year.

#### 7. AOB

None.