

Minutes of the BM@N DAC meeting on February 5, 2020

Present: H.H. Gutbrod, Peter Hristov, Hans Rudolph Schmidt (via video), Itzhak Tserruya, Vladimir Kekelidze, Mikhail Kapishin and many members of the BM@N Team

Introduction

Speaker: Vladimir Kekelidze (LHEP, JINR)

STS TDR and hardware status 1h

Speaker: Dmitrii Dementev (JINR LHEP)

Status of the BM@N detector upgrade 50m

Speaker: Anna Maksymchuk (JINR)

Status of the beam line and beam detectors 40m

Speaker: Dr Sergey Sedykh (JINR)

Vladimir Kekelidze gave an overview on the NICA project. He pointed out many problems leading to further delays in the overall project. The possibility to run heavy ions beams at the BM@N depends on the transfer-line from Booster to Nuclotron, light ions are available. Hope is that the Booster will be connected by September 2020.

The DAC notes the submission of the full TDR of the Silicon Tracking system, and will give its remarks at the June 2020 meeting. Several of the questions raised in this DAC meeting may have their answers already in the TDR.

Dmitri Dementev gave a fine presentation of his work done in collaboration with Peter Senger. The presented analysis of simulations of the hybrid tracking system, consisting of STS and GEMs, showed that the track reconstruction efficiency is affected by the low granularity of the GEMs. Close to the beam, pads should be used instead of GEM strips. The DAC appreciates the progress of the simulations and encourages this work, especially leading to further improvements of the Lambda reconstruction efficiency.

Radiation level studies with FLUKA have been presented. Sensor lifetime has been studied. The DAC sees a strong effect of the presently unknown beam halo onto the Si detectors close to the beam. **Therefore, the DAC requests further studies of the beam profile in the target region.** The last Dipole may be of help, but may also sweep the spray of particles produced up-stream.

The assumed Au beam with a kinetic energy of 4.5A GeV, a profile with a width of $\sigma = 3.5$ mm, and a divergence of 1mrad is in the eyes of the DAC not optimal for a successful

experimental program, even the BM@N is going to track the beam particles ahead of the target, to overcome that obstacle. At lower beam energies the beam-size will be even bigger.

The BM@N DAC repeats its request for further studies and improvements of the beam size in a study together with the accelerator and beam line responsible experts. Installation of a collimator system way-upstream is to be considered if no other improvements can be found.

The DAC takes note of the anticipated next run in 2021.

The DAC expresses its serious concern with the plan to have an intermediate STS configuration in the first run in 2022 before installing the final set-up for the run in 2023. This plan will complicate analysis and simulations of data. The DAC urges the STS team to come up with a revised plan that has the 4 Si stations ready for data taking in the run of 2022.

Anna Maksymchuk presented the status of the BM@N detector upgrade. The Beam pipe before the target was explained with all its detectors inside. She reported on the installation procedure of the STS tracker, of the GEM set-up, the CSCs, the electronics, the status of the TOF system, the FHCAL and other detectors, and tests with a 3.2 AGeV Argon beam.

The DAC appreciates the progress. The DAC advises to reduce the mass of the material upstream of the target, in order to avoid small angle scattering. If the beam geometry can be improved some of the beam detectors should be removable.

Sergey Sedykh presented the Status of the beam line and beam detectors.

The DAC appreciates that the collaboration is now working on the vacuum beam line downstream of the target, repeatedly requested by this DAC over the past years. The DAC sees serious complications in the operation of the experiment due to bent structure of the beam pipe.

The DAC request a written report for the upcoming June meeting, addressing how the collaboration will operate the set-up for obtaining all needed data for the tracking analysis, when the experiment is

- a) **At a fixed beam energy: Changing the magnetic field to *Field OFF, Field polarity reversed,***
- b) **Changing the Beam energy**

The DAC requests this report to be created in collaboration with the detector and tracking team of BM@N.