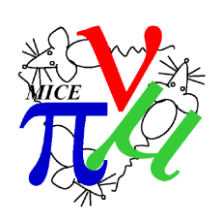


Beam(line) Commissioning at Step IV

J. Pasternak,

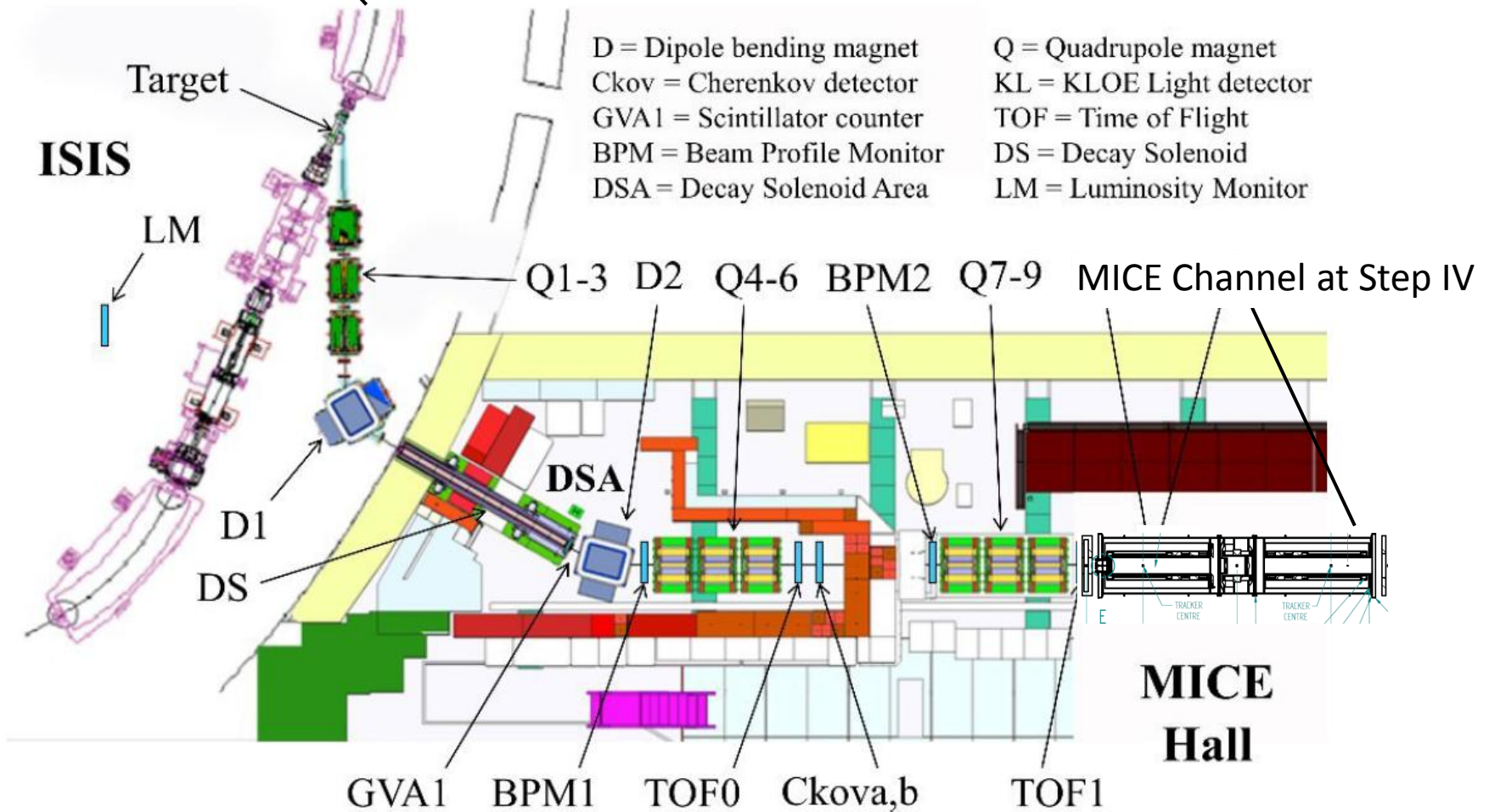
Imperial College London/RAL-STFC



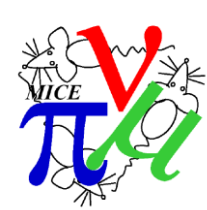
Outline

- Introduction
- Commissioning Activities
- Open questions
- Analysis
- Summary

Introduction

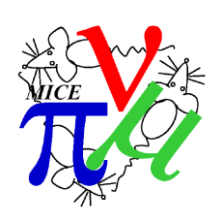


MICE Beam Line
Conceptual Layout



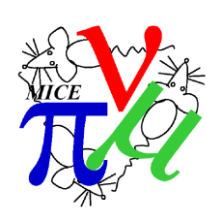
Commissioning Activities

- **Beamline pre-commissioning:** Repeat of Step I phase space reconstruction with new beamline settings (taking into account Diffuser modifications and special settings)
- **Magnet Commissioning:** commissioning of all the systems required to have the MICE Cooling Channel ready for beam (includes, QD/QP system, electrical tests, magnet training etc.)
- **Beamline commissioning:** commissioning of beamline and USS optics matching including the effect of the Diffuser (requires SSU magnetic field and Tracker, both commissioned)
- **MICE Cooling Channel commissioning:** assessment of MICE Channel optics, alignment with empty absorber.



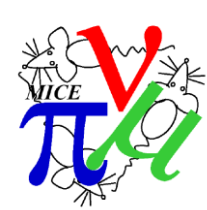
Commissioning Activities (2)

- **Beamline pre-commissioning:** Repeat of Step I phase space reconstruction with new beamline settings (taking into account Diffuser modifications and special settings)
 - 3 dedicated shifts taken
 - Old Step I settings repeated successfully
 - Several new settings dedicated to Tracker commissioning made and run
 - ...we only started to play with the Diffuser so I would wish to continue in November/December (no Channel magnets required) and we can use the Trackers (at least the upstream one).



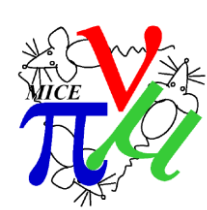
Commissioning Activities (3)

- **Magnet Commissioning:** commissioning of all the systems required to have the MICE Cooling Channel ready for beam (includes, QD/QP system, electrical tests, magnet training etc.)
 - Its much more complex than expected
 - Issue dominated
 - **Dictates our schedule**
 - We are still in **the individual training mode**
 - SSU is almost ready
 - FC is now very advanced with respect to the solenoid mode
 - SSD -> please see SS talk(s)
 - **The procedure for the combined training needs to be revised and turned into the operation checklist.**



Combined Magnet Training

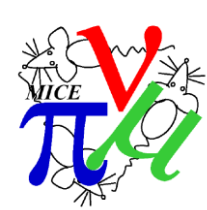
- Once all magnets reached their independent nominal settings, set nominal current in both SSs and start raising current in the FC.
 - Detecting which coil quenches first knowing the FC current will allow to assess how far we are from the nominal setting:
 - Depending on experimental findings the procedure may be followed by:
 - Training the FC with SS currents fixed at nominal (repeating the procedure).
 - Training the FC with SS currents fixed at derated value (to be defined).
 - Switching to combined training (Scenario 1 with ramping all magnets simultaneously at approximately 2.5 quench per week incl. 40% contingency)



Combined Magnet Training

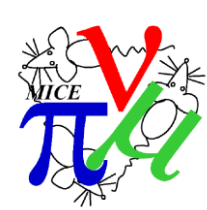
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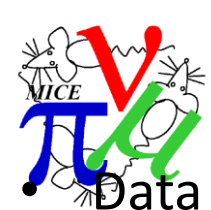
Commissioning Activities

- **Beamline commissioning:** commissioning of beamline and USS optics matching including the effect of the Diffuser (requires SSU magnetic field and Tracker, both commissioned)
 - 15 shifts requested (**only 1 real performed -7th October**), perhaps we can include 2 more with half field to certain extend
 - It requires at least SSU with E2-C-E1 energised, which now requires revision of QP system to be run (my understanding)
 - Needs to be continued (probably combined with physics)



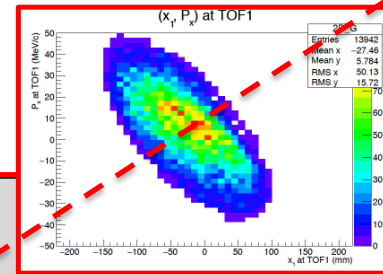
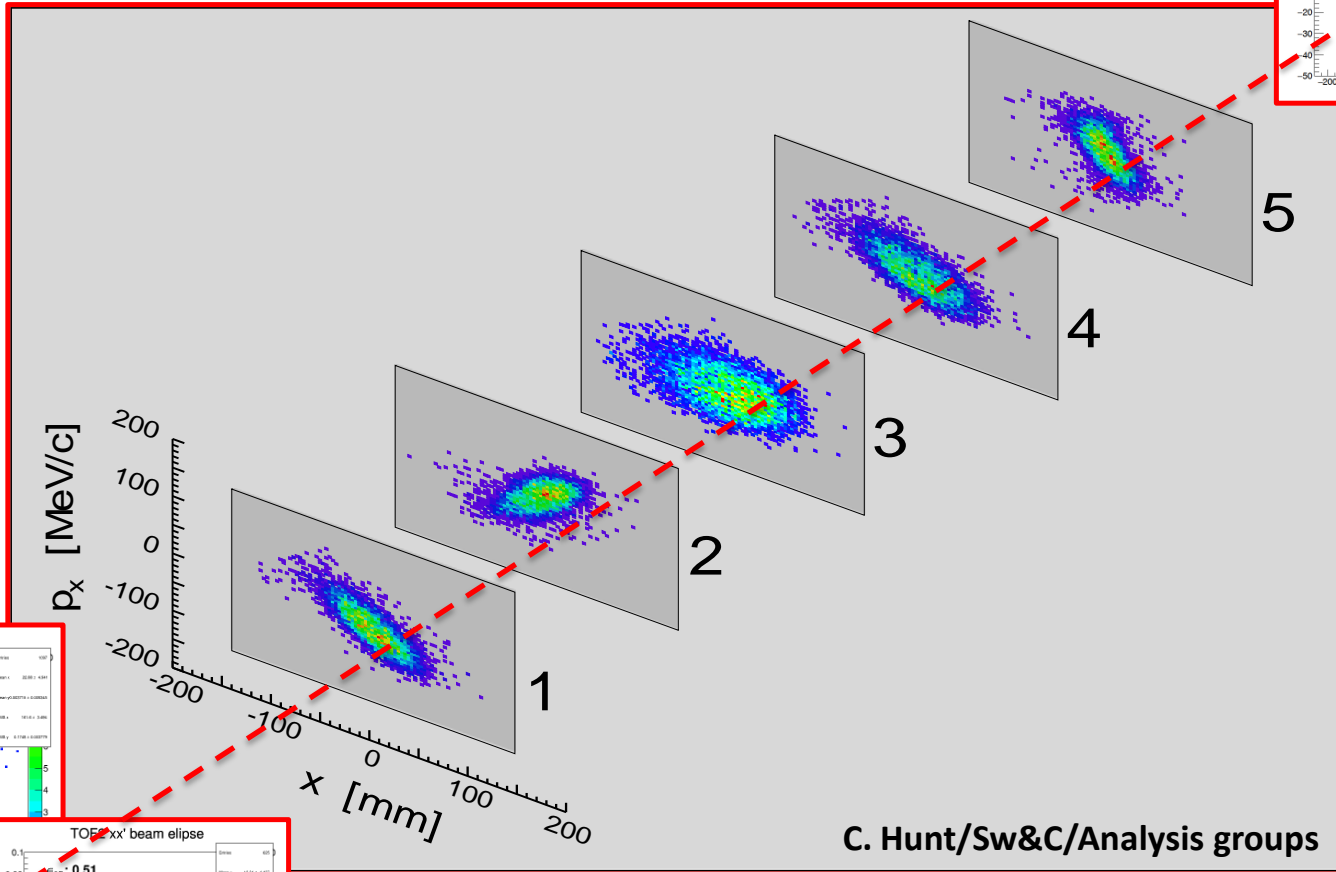
Open questions for Beamline Commissioning

- How is the matching defined at Step IV without M1?
 - what is SSU field?
 - do we maintain a rigorous match?,
 - how do we match, if we only use beam selection for creation of the cooling channel beam?



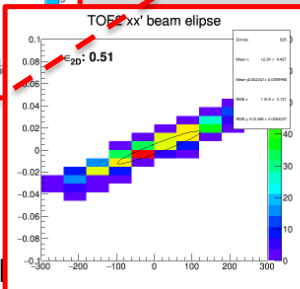
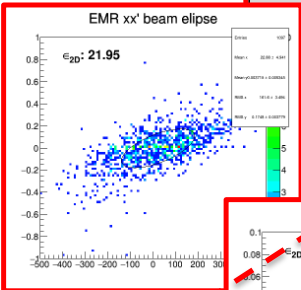
Commissioning analysis

Data from 7th October: SSU(E-C-E) 4T

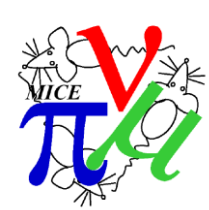


TOF1
(from Victoria)

C. Hunt/Sw&C/Analysis groups

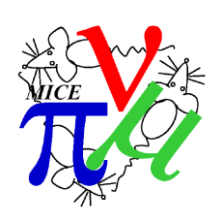


Hall probes data (from Melissa) are also being used!



Commissioning Activities

- MICE Cooling Channel commissioning: assessment of MICE Channel optics, alignment with empty absorber.
 - Not even started
 - Will be combined with physics



Summary

- Beam(line) commissioning is delayed due to magnet commissioning issues.
- The detailed programme for Step IV is now dictated by the “M1 issue” and the follow up still needs to be defined in detail.
- We **could (should)** use functioning instruments to obtain more information and take more data in November/December **(personal opinion)**.
-> **This should be discussed.**