Imperial College London

K. Long,
13 November, 2014

Spokesman's update

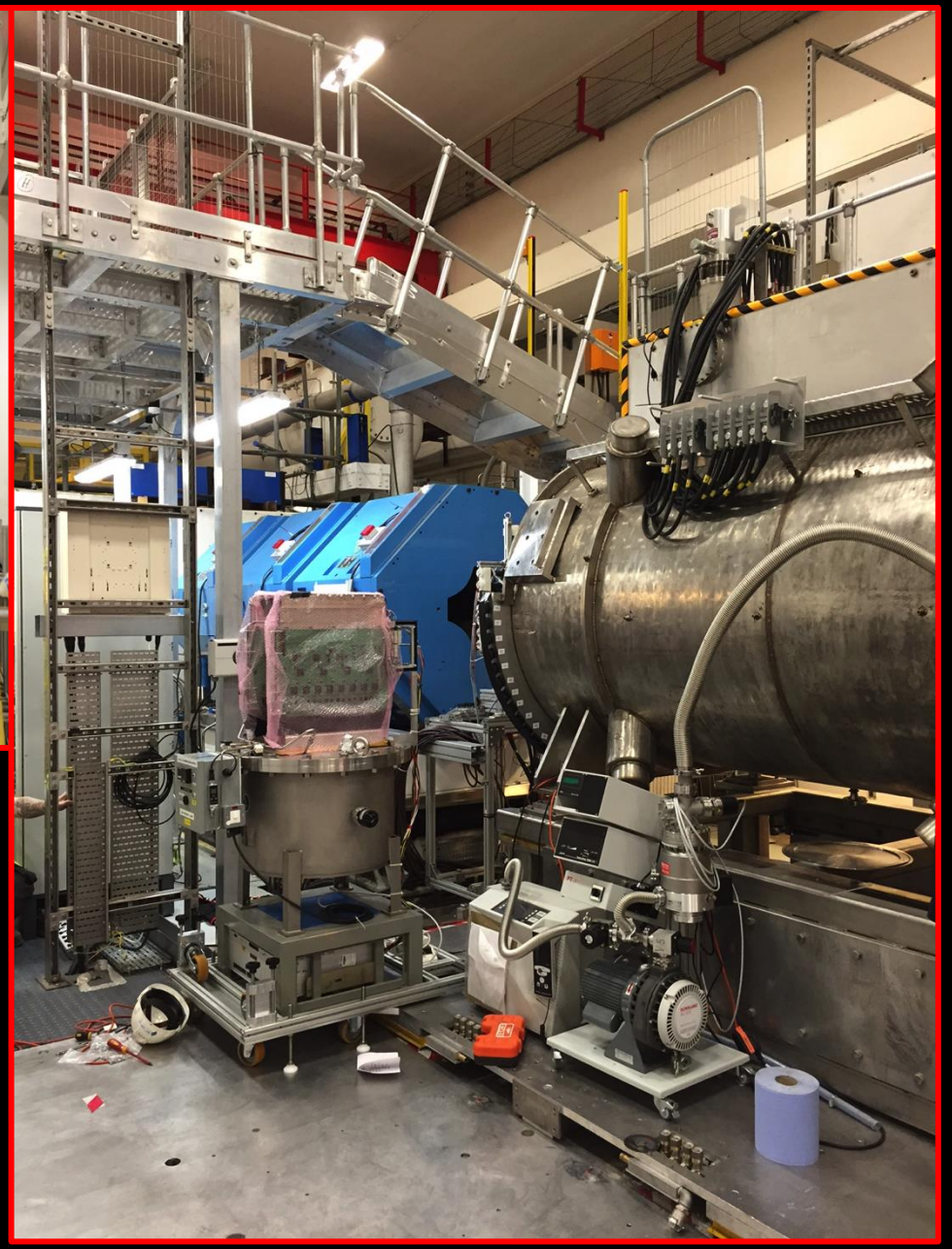
Contents:

- Update
- Ionization cooling demonstration
  [with reacceleration]
- RLSR, MPB and FAC
  [24&25 November 2014]
- VCs & CM41

Spokesman's update

Update:

Update: MICE Hall; tracker, PRY and services:



- **PRY:**
  - **Preparation for installation of bases and restraints advancing:**
    - **Expect to be bolting steelwork in place by the end of November**

See J.B. Lagrange's contribution

Spokesman's update

Demonstration of ionization cooling

[with reacceleration]

Reprise: 1 slide from August DOE debrief:

VC 22Aug14

Going forward; my view:

- Support preparation of document as requested in the DOE by 15Sep14:
  - Initial "good enough) analysis of Step 3pi/2;
  - Initial analysis of cost/schedule/risk;
- The revised plan is further developed and "put before" the collaboration at its next meeting (24-28Oct 2014):
  - By this time the necessary detailed studies to assess the level of performance will have been done carefully and the collaboration will have had time to deliberate;
- The next international review of the project (Nov 2014):
  - Resource Loaded Schedule Review panel; and the
  - MICE Project Board
- will then review the consensual revised plan and present to the Funding Agency Committee their recommendations
  - If we do our work properly I would anticipate that the recommendations will be in line with the our analysis

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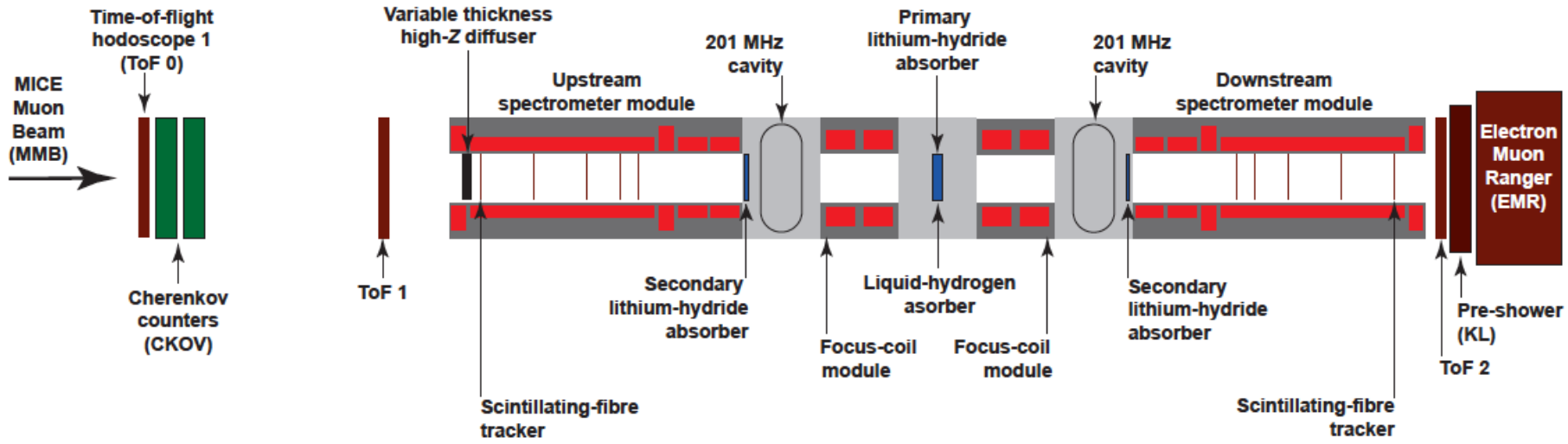
Ionization cooling demonstration:



- … or demonstration of ionization cooling:
  - If you must abbreviate:
    - Cooling demo
- Studies so far reported in:
  - MICE Note 452
- Excellent work!

Criteria:

- Priority-ordered criteria that came out of CM40:

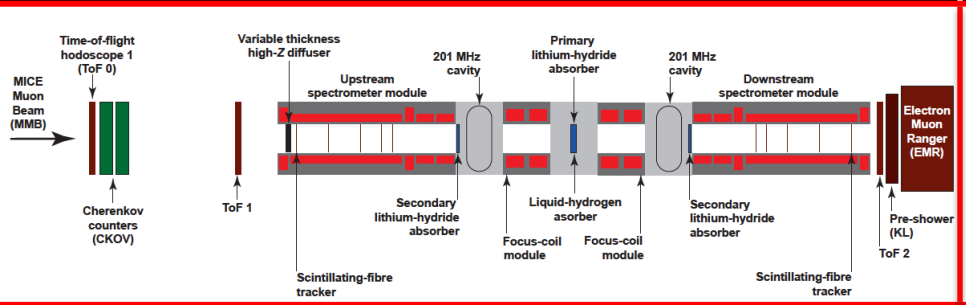
1. 4D emittance reduction; transmission/scraping:
   - Have not (yet) studied full simulation/reconstruction;
   - Therefore essential that adopted configuration that produces largest 4D cooling effect; best chance for systematic study.

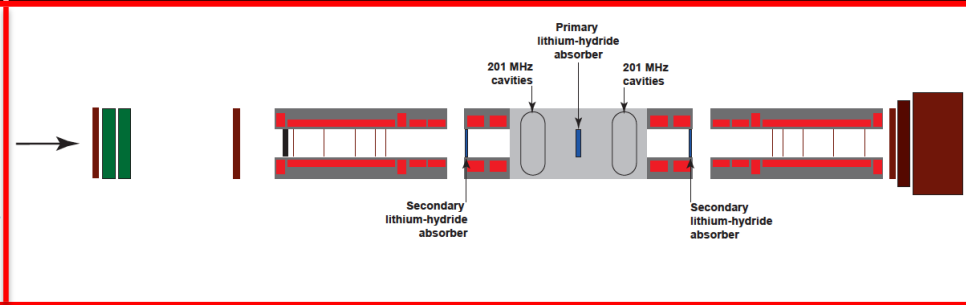
2. 6D emittance reduction:
   - Largest change in 6D emittance presented at the CM at ~1% level;
     - Confirmed for reference and alternative since; still under study;
     - Very large data sets likely to be needed to measure such a small effect;
     - 6D emittance reduction is a desirable, rather than essential.

3. Lattice cell:
   - MICE approved to demonstrate “realistic” section of cooling channel;
   - Ideally cell constructed would be part of an extended cooling channel;
   - Implies appropriate matching criteria;
     - Applied in developing reference/alternative
   - Lattice cell suitable for incorporation extended channel desirable

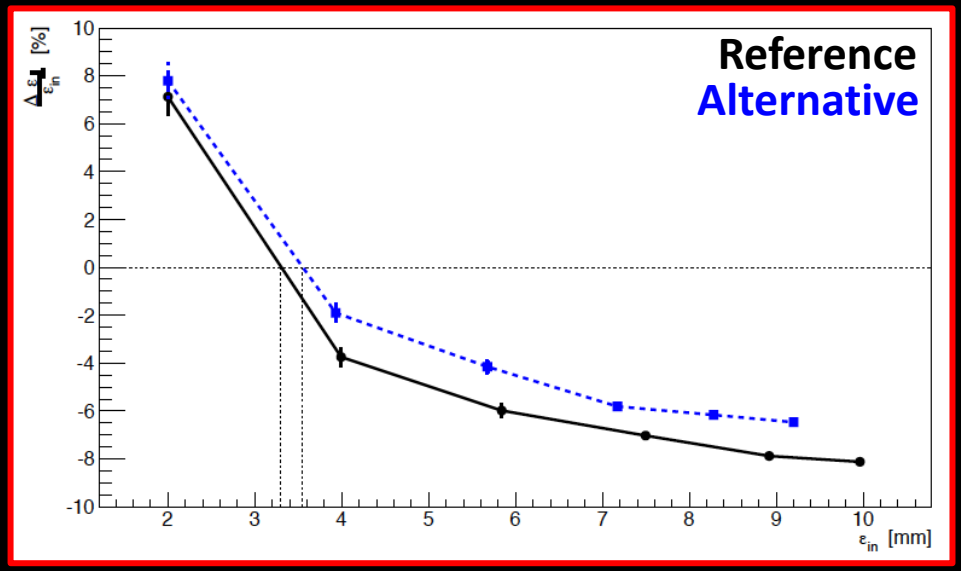
Performance:

Reference | Alternative

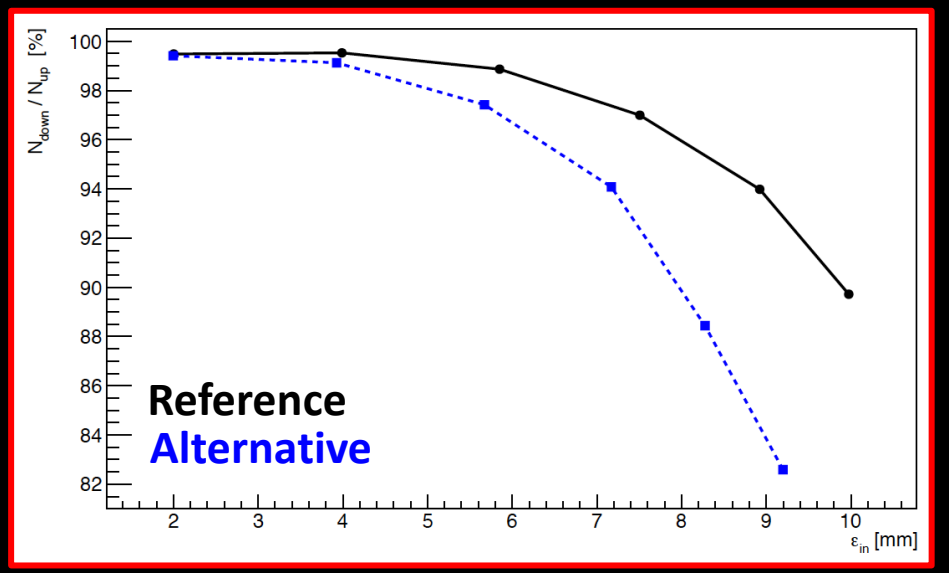




4D cooling



Transmission



- Reference lattice therefore confirmed:
  - Studies of 6D performance in hand:
    - Indication is that performance of reference and alternative very similar
  - Would need substantial performance advantage for alternative to displace reference

Currents:

Table 4: Coil currents used for $(\varepsilon_\perp, p_z) = (6, 200)$ MAUS simulations in the $[++--]$ configuration. Coils are defined in Table 1.

Coil	Reference Lattice (A)	Alternative Lattice (A)
Upstream E2	+253.00	+255.46
Upstream C	+274.00	+288.27
Upstream E1	+234.00	+239.37
Upstream M2	+203.13	+260.83
Upstream M1	+240.61	+230.94
Upstream AFC1	+77.86	+69.81
Downstream AFC1	+77.86	+69.81
Upstream AFC2	−72.94	−67.85
Downstream AFC2	−72.94	−67.85
Downstream M1	−218.39	−210.32
Downstream M2	−187.68	−242.12
Downstream E1	−234.00	−239.37
Downstream C	−274.00	−288.27
Downstream E2	−253.00	−255.46

- **FC currents:**
  - **FC1 and FC2 tested to 120A in solenoid mode:**
    - **Good!**
- **SS M1 and M2:**
  - **Reference lattice gives better margin for M2 in SSU**

Spokesman's update

RLSR, MPB and FAC

[24 and 25 November 2014]

Documentation and presentations:

MICE » Governance

Overview | Activity | Issues | Documents | Wiki

2014-11-24-Review

History

Documentation

- Single PDF containing all files:
  - Concatenated pdf: 00-2014-11-11-All-files.pdf
- RLSR:
  - Resource loaded schedule, costs and risks for the completion of the MICE project
- Response to feedback:
  - Resource loaded schedule, costs and risks for the completion of the MICE project
- MPB:
  - Status report
- Supporting documents:
  - The MICE Demonstration of Ionisation Cooling: Technical Note
  - MICE Assumptions Document
  - Documentation of prioritised controls plan
  - Online support plan
  - Magnet commissioning at Step IV
  - Commissioning and operations at Step IV
  - RF test plan and consideration of commissioning of ionization cooling demonstration
  - Initial consideration of the running required for the demonstration of ionization cooling
  - Response to recommendations of DOE August 2014 review of MAP and MICE: DOE_Response_2014_0925_FINAL.pdf
  - Initial response (July 2014) to recommendations

Back

Documentation and presentations:

MICE » Governance

Overview | Activity | Issues | Documents | Wiki

2014-11-24-Review-preparation

History

DRAFT agendas - RLSR4, MPB8 & FAC

RLSR, MPB-8 & FAC outline agendas - November 24 & 25, 2014
CR16 R80

Monday November 24th

RLSR & MPB-8 outline agendas

- **09:00-09:45** RLSR closed session – introduction
- **09:45-10:15** Project overview — **K. Long**: 20′ + 10'
- **10:15-12:45** RLSR presentations & questions
  - **10:15-10:50** Schedule to completion and project risks — **R. Preece**: 25′ + 10′
  - **10:50-11:30** US project plan for MICE — **M. Palmer**: 30′ + 10′
  - **11:30-12:00** UK financial plan, risks — **A. Grant**: 20′ + 10′
  - **12:00-12:45** Unscheduled: 150′ - 105′ = 45'
- **12:45-13:15** Lunch
- **13:15-14:00** RLSR closed session – critical findings
- **14:00-15:30** Data taking, simulation & reconstruction
  - **14:00-14:30** S/w&C overview — **D. Rajaram**: 20′ + 10′
  - **14:30-15:00** Online — **P. Smith**: 20′ + 10'
  - **15:00-15:30** MAUS (simulation and reconstruction) — **A. Dobbs**: 20′ + 10′
  - Unscheduled 90′ - 90' = 0'
- **15:30-16:00** Closed session, report writing
- **16:00-17:30** SC magnets & RF
  - **16:00-16:30** FCs — **S. Watson**: 20′ + 10′
  - **16:30-17:00** RF system overview and RF power — **K. Ronald**: 20′ + 10'
  - **17:00-17:30** Cavity modules, PRY and SS — **A. Bross**: 20′ + 10′
  - Unscheduled 90′ - 90′ = 0'
- **17:30-18:00** SC magnets & RF closed session
- **18:00** Adjourn

Tuesday November 25th

MPB-8 outline agenda

- **9:00-10:30** Commissioning, operations & control
  - **09:00-09:35** Commissioning and operations overview — **S. Boyd**: 25′ + 10′
  - **09:35-09:50** MICE/ISIS liaison, the ISIS perspective — **Z. Bowden**: 10′ + 5′
  - **09:50-10:20** Controls and monitoring — **P. Hanlet**: 20′ + 10′
  - **10:20-10:30** Unscheduled 90′ - 80′ = 10'
- **10:30-11:30** Closed session, report writing
- **11:30-12:00** Close-out with MICE management

Papers:

Table 2: Physics and technical papers being prepared by the collaboration.

Title	Lead authors
Step I physics	
Electron Muon Ranger: performance in the MICE Muon Beam	A. Blondel, F. Drielsma, R. Asfandiyarov
Measurement of the pion contamination in the MICE Muon Beam	D. Orestano, D. Nugent, P. Soler
Step IV physics	
Commissioning of the MICE experiment in the Step IV configuration	C. Rogers
Ionization cooling demonstration	
Design and expected performance of the MICE demonstration of ionization cooling	V. Blackmore, J. Pasternak, C. Rogers
Technical	
The MICE target upgrade	C. Booth
The design construction of the MICE Electron Muon Ranger	R. Asfandiyarov, A. Blondel, F. Drielsma
The Reconstruction Software for the MICE Scintillating Fibre Trackers	S. Dobbs
The MICE Analysis and User Software framework	D. Ragaram

Wise people appointed

Prioritisation of Step IV data taking:

- **Pressures:**
  - **Completion and commissioning of Step IV;**
  - **Start of reconfiguration for cooling demo;**
  - **Staffing for safe operations 24/7 versus 16/5**

1	Detailed scan (with $\sim$ 20k good muons per point) of the effect of empty, liquid-hydrogen and lithium-hydride absorbers as a function of betatron function (9 points) at the nominal momentum of 200 MeV/c.
2	1 & detailed scan (with $\sim$ 20k good muons per point) of the effect of empty, liquid-hydrogen and lithium-hydride absorbers as a function of momentum (9 points) at the (single) nominal betatron function (β) of 420 mm.
3	1, 2 & 100k good muons per point muons at the nominal $\beta = 420$ mm, $p = 200$ MeV/c, scanning over emittance (3 points) with empty, liquid-hydrogen and lithium-hydride absorbers.
4	1, 2, 3 & detailed scan (with $\sim$ 20k good muons per point) of the effect of liquid-hydrogen and lithium-hydride absorbers as a function of betatron function (9 points) and emittance (3 points) at the (single) nominal momentum of 200 MeV/c.
5	1, 2, 3 & sampling of 3×3 emittance, momentum matrix at three betatron functions with reduced sample size ($\sim$ 25k good muons per point).
6	1, 2, 3 & sampling of 3×3 emittance, momentum matrix at three betatron functions with reduced sample size ($\sim$ 50k good muons per point).
7	1, 2, 3 & sampling of 3×3 emittance, momentum matrix at three betatron functions with reduced sample size ($\sim$ 100k good muons per point).

Spokesman's update

VCs and CM41

VCs and CM41:

- Video Conferences:
  - 11th December 2014
  - 22nd January 2015

- CM41:
  - RAL: 9th to 13th February 2015