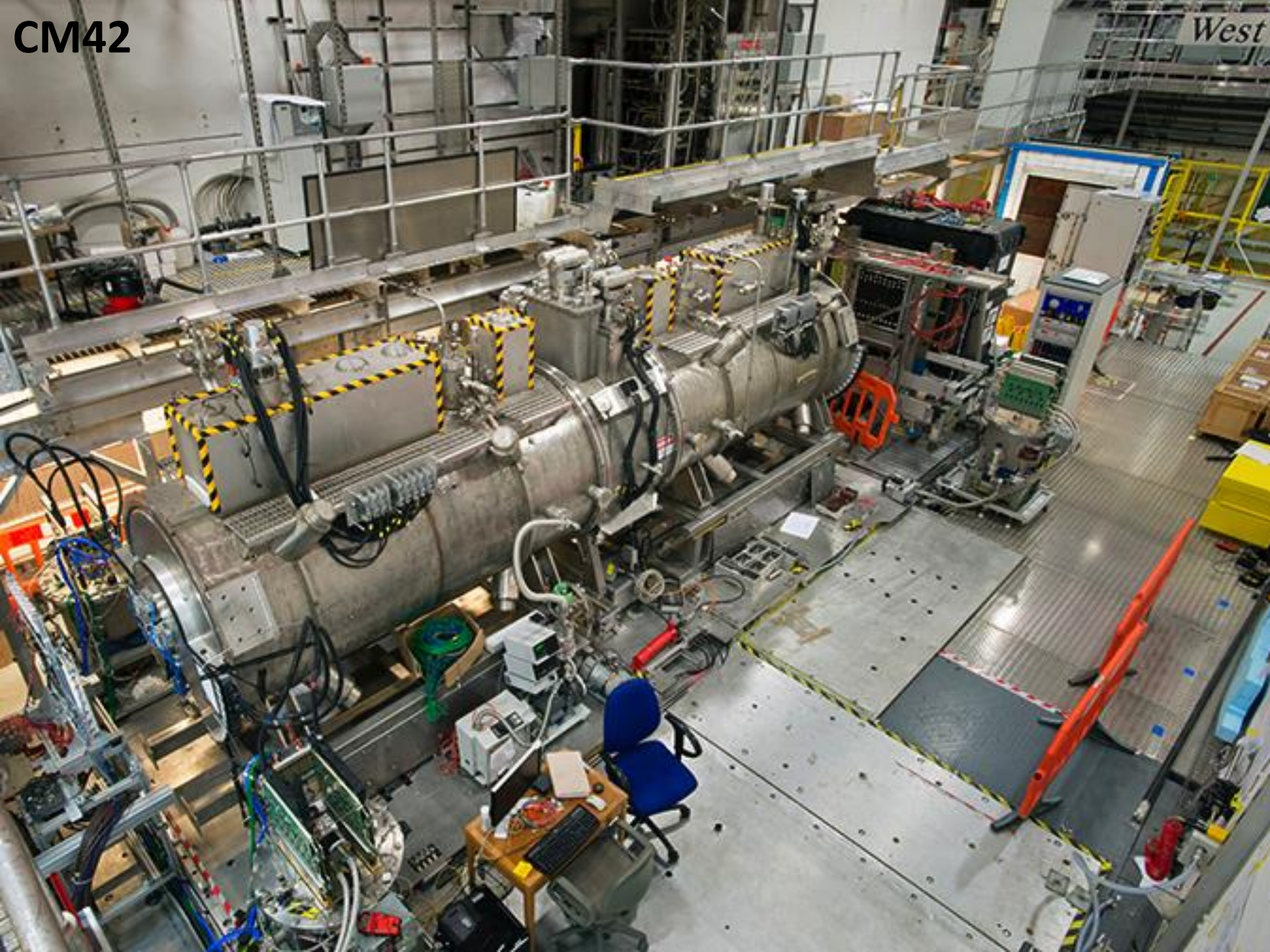
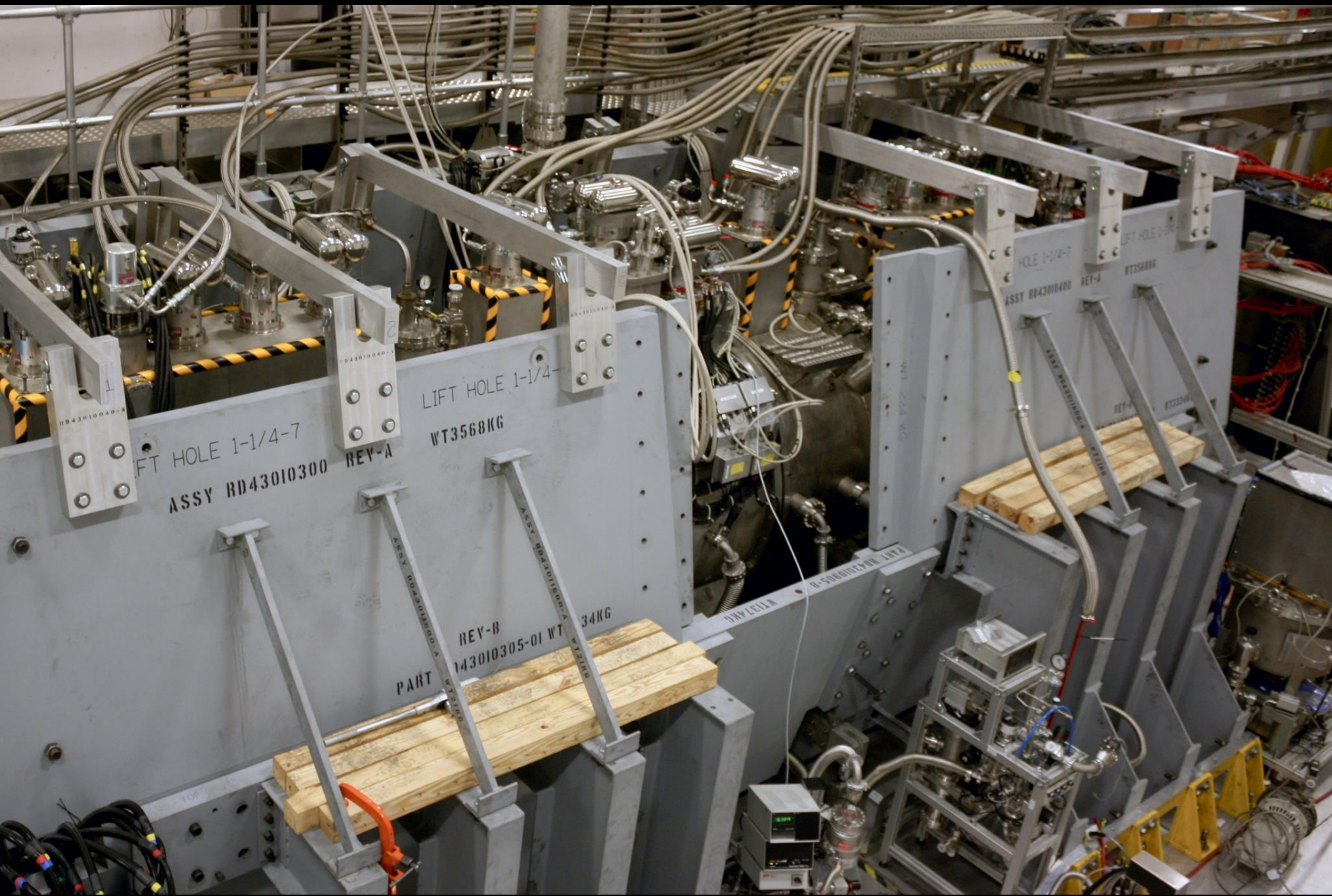


Introduction

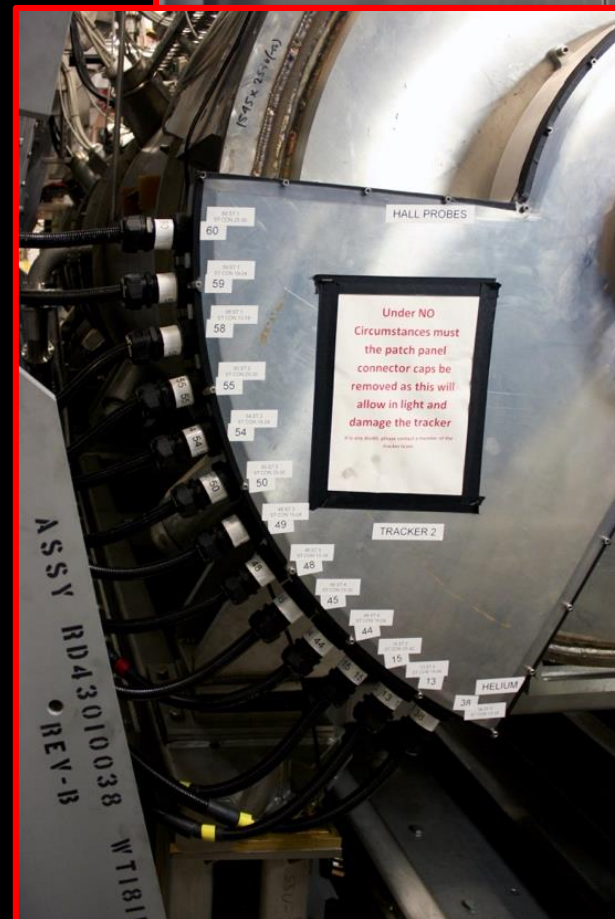
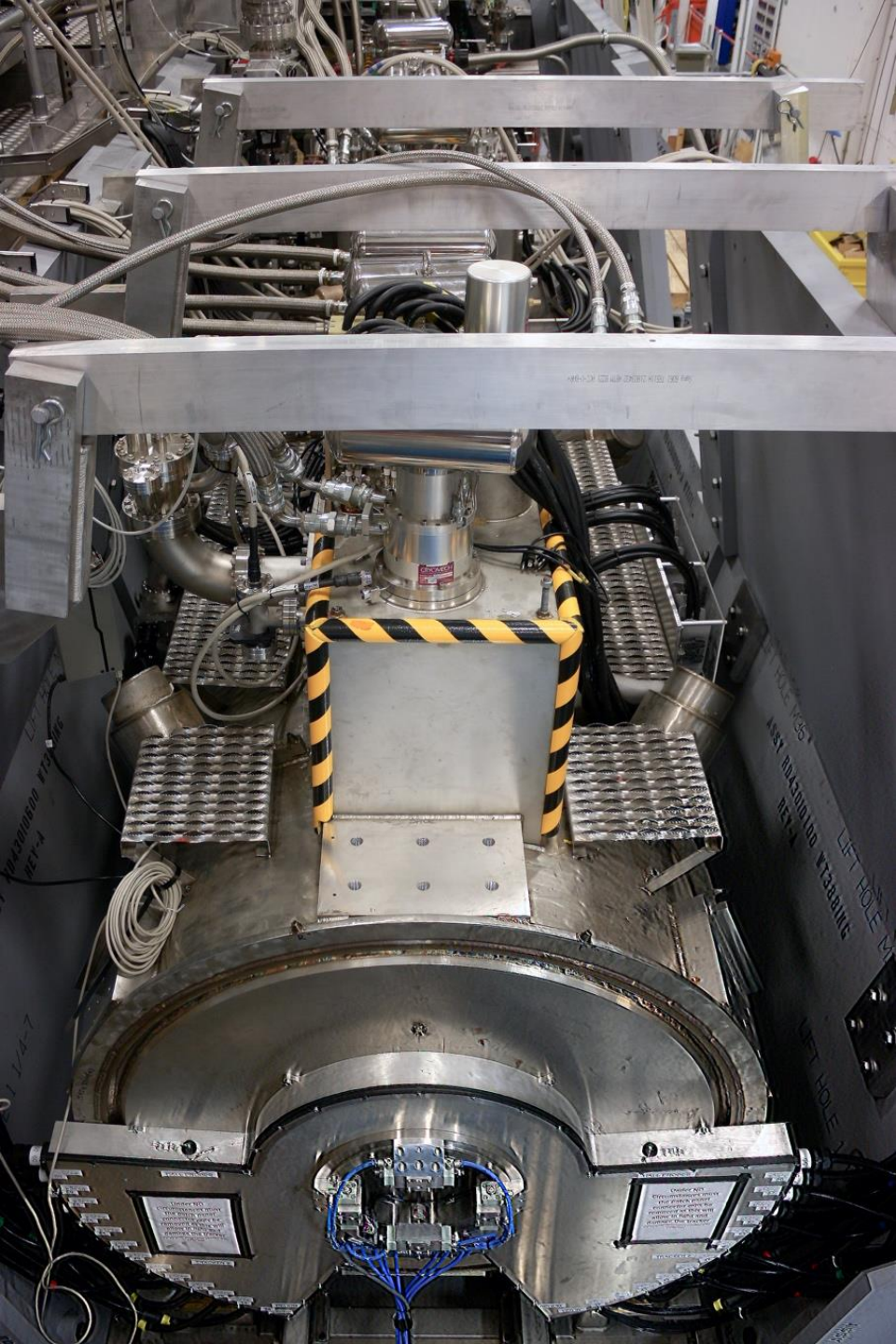


CM42

West







Contents:

- Status update:
 - Step IV
 - Demonstration of ionization cooling
- Operations
- Software, computing and analysis
- Publications
- Next steps

Introduction

STATUS

Step IV installation status

- **PRY installed**
 - **All plates fitted**
 - End-plates & “removable” middle plates removed for access
- **MICE-channel magnets**
 - **“In position”**
 - Surveyed; verify with tracks
 - **Services**
 - High-pressure hoses complete
 - Power: complete
 - Sensor cables: complete
- **Instrumentation**
 - **Commissioned:**
 - Time-of-flight system
 - Cherenkov counters
 - Calorimetry
 - **KL (preshower)**
 - **EMR (totally active calorimeter)**
 - **Scintillating-fibre tracker:**
 - **Upstream/downstream:**
 - **Calibrated;**
 - **Commissioned**
 - **Downstream:**
 - **Issue:**
 - ~5% dead channels
 - Under investigation

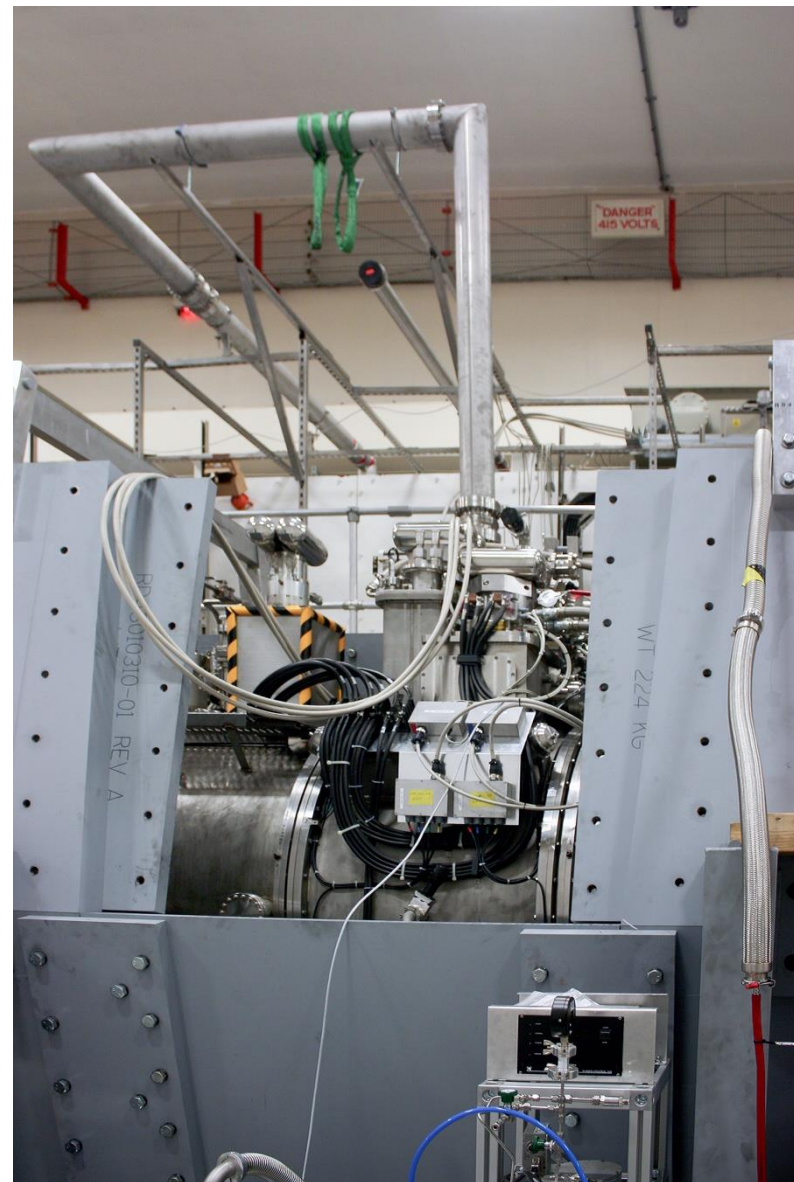
Enormous amount achieved

- **Fantastic team effort!**
- **Still many details to tie down**



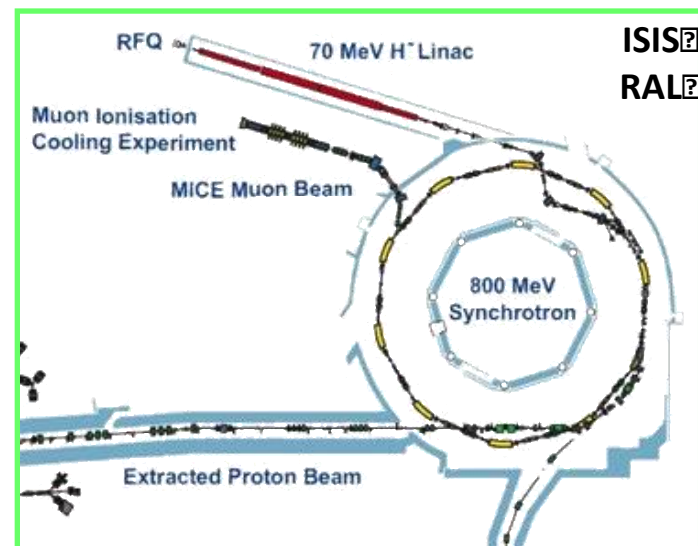
First absorber for Step IV

- **Safety review of LH2 system Jan15:**
 - **Part of safety “sign-off to operate Step IV” process**
 - **Required:**
 - Additional safety-window burst tests; and
 - Enlarged emergency H2-gas evacuation line
- **Status of implementation:**
 - **Burst-tests complete; satisfactory**
 - **Enlarged relief line agreed and installed**
- **Next steps:**
 - **Demonstrate satisfactory operation with He gas**
 - **Obtain permission to operate with LH2**

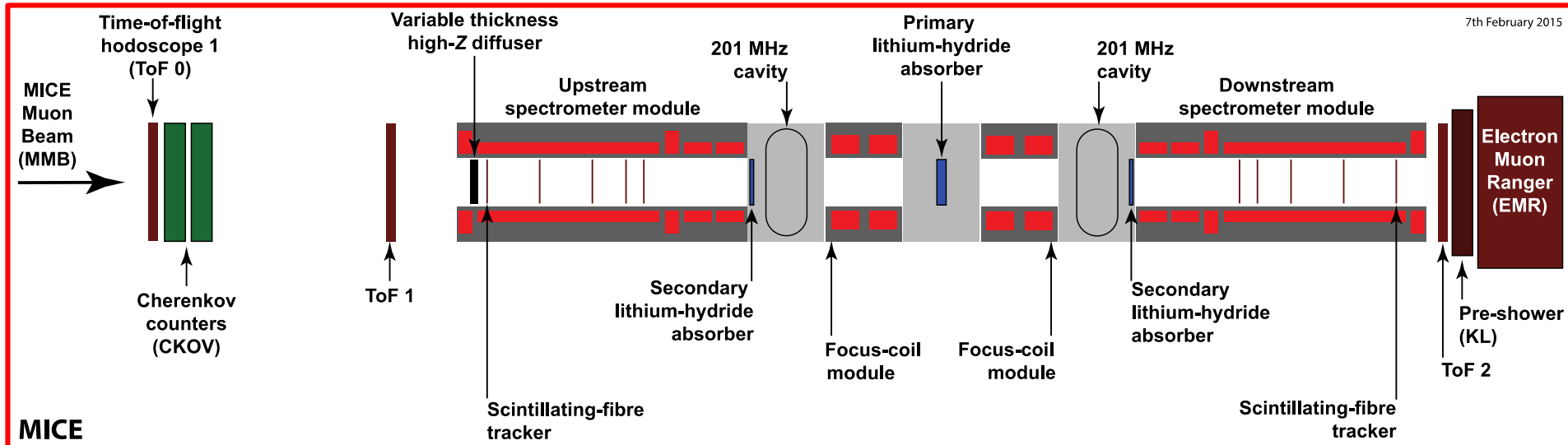


Demonstration of ionization cooling

- MICE approved to:
 - Design, build, commission and operate a realistic section of cooling channel
 - Measure its performance in a variety of modes of operation and beam conditions
 - Results will allow Neutrino Factory [and Muon Collider] complex to be optimised
- Requirements:
 - Normalised transverse emittance: 0.1%
 - Requires selection of 99.9% pure muon sample

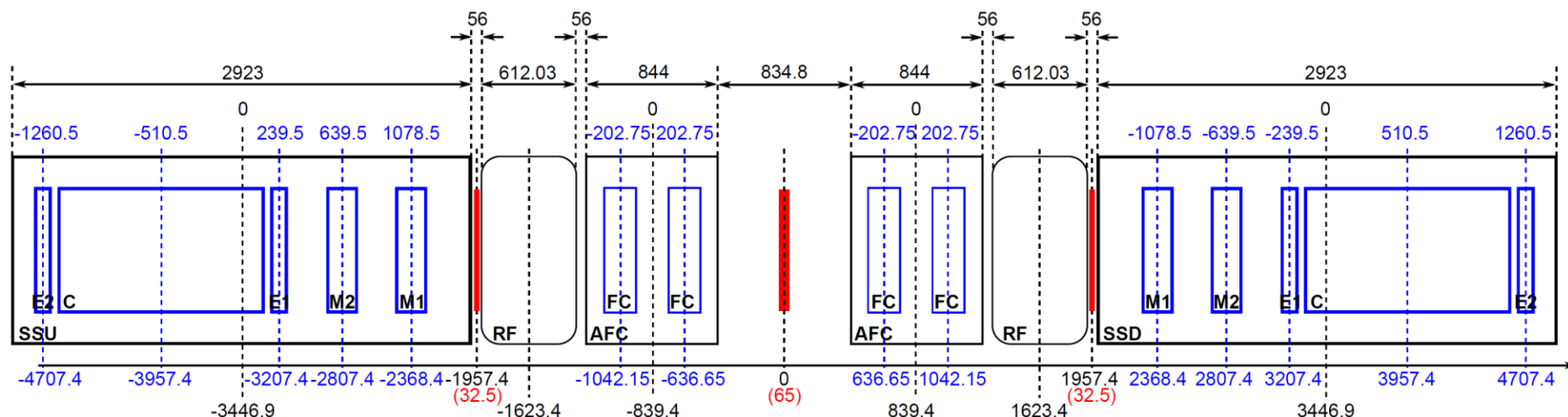


7th February 2015



Lattice for Cooling DEMO (200 MeV/c, asymmetric, ++--) 16/06/2015 (TSU, SAu, RFu, FCu, MA, FCd, RFd, SAd, TSD)

Layout with dimensions



Some global dimensions

mm

Cell length (centre of upstream AFC to centre of downstream AFC)

1678.8

Central volume length (upstream AFC inner flange to downstream AFC inner flange)

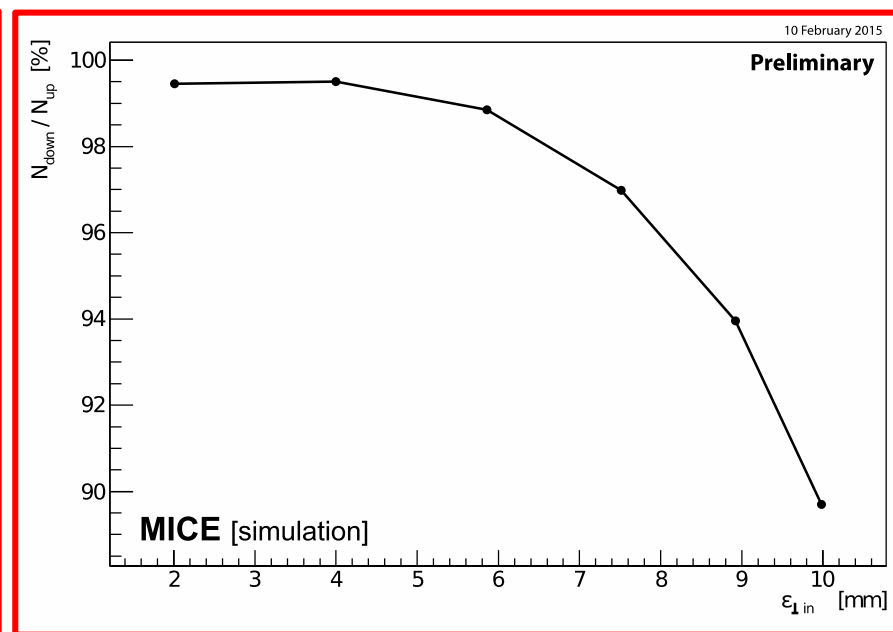
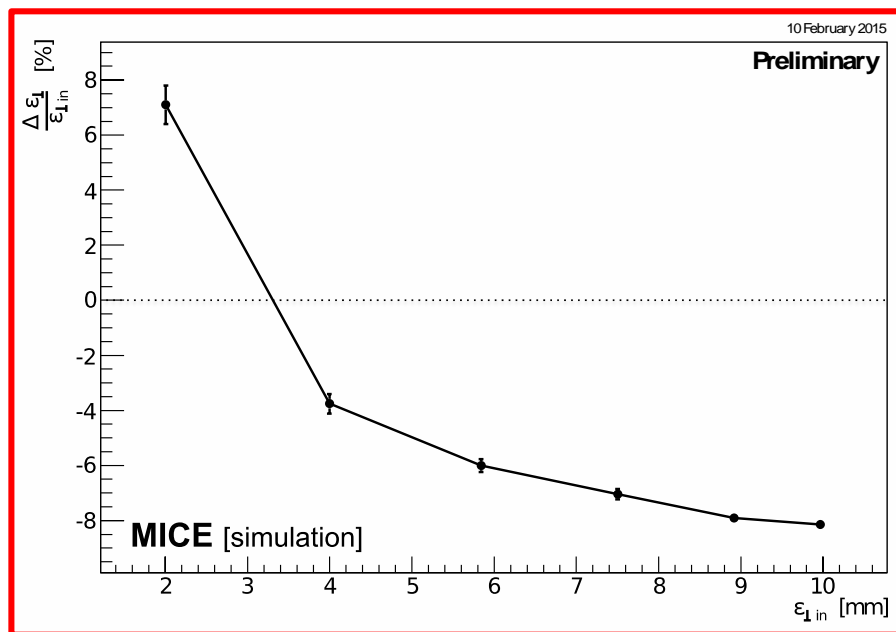
834.8

RF straight (inner SS flange to outer nearest AFC flange)

724.03

Overview of schedule:

- Study of the factors that affect ionization cooling (Step IV):
 - Construction complete: ~Now!
 - Data taking: Summer 2015—June 2016
- Demonstration of ionization cooling:
 - Construction complete: Early 2017
 - Data taking start: Spring 2017

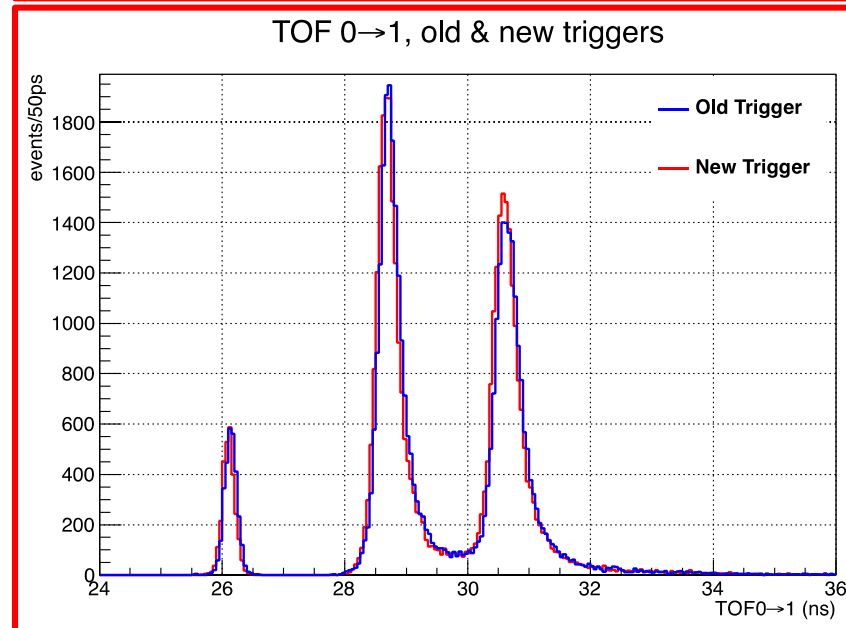
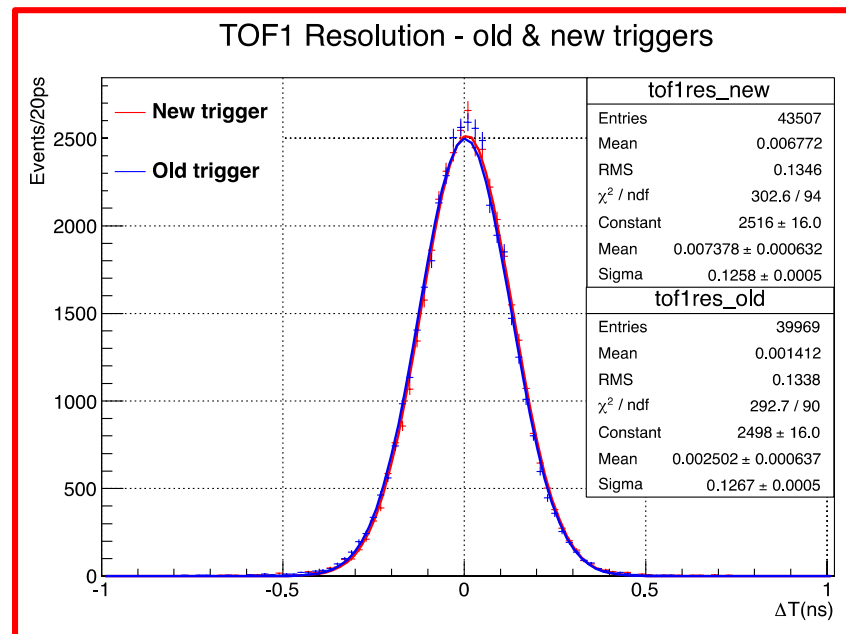


Introduction

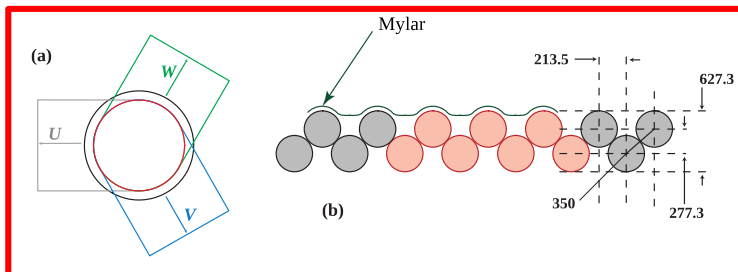
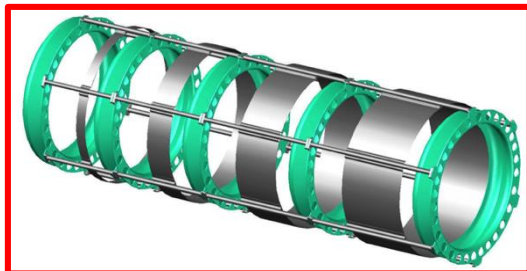
OPERATIONS

Operations Mar/Apr

- **User Run 2014(03); March/April:**
 - **16 hour operation**
 - 2 shifts, Saturday & Sunday
- **Goals:**
 - **March 2015 (no decay solenoid):**
 - Initial calibration of the TOF0,1 and CkovA and CkovB;
 - Validate new FPGA-based trigger; and
 - Take “pion” data to test muon beam-line optimisation.
 - **April 2015 (with decay solenoid):**
 - Initial optimisation of the MICE Muon Beam;
 - Initial calibration of TOF2, the KL and the EMR; and

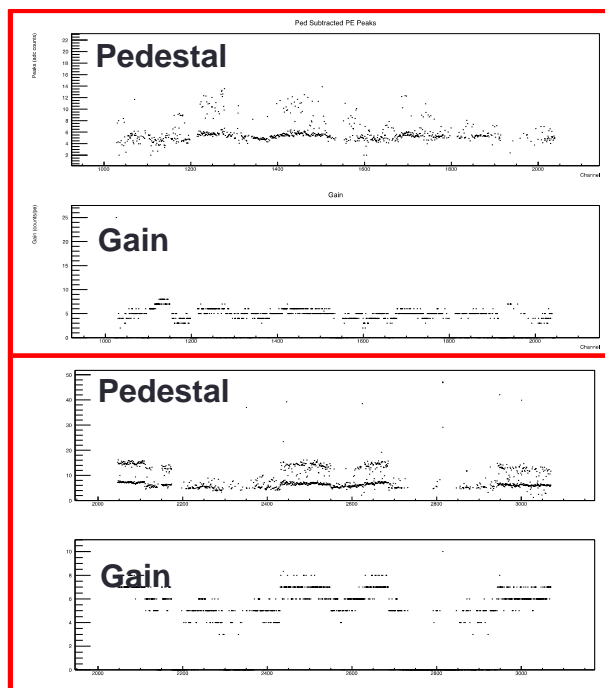


MICE trackers

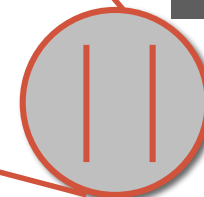
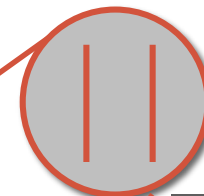
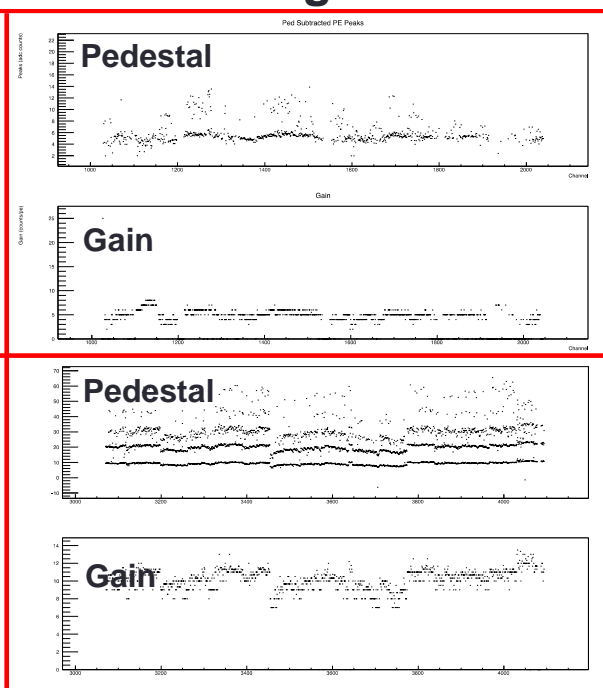


- Calibration of upstream tracker:

Left



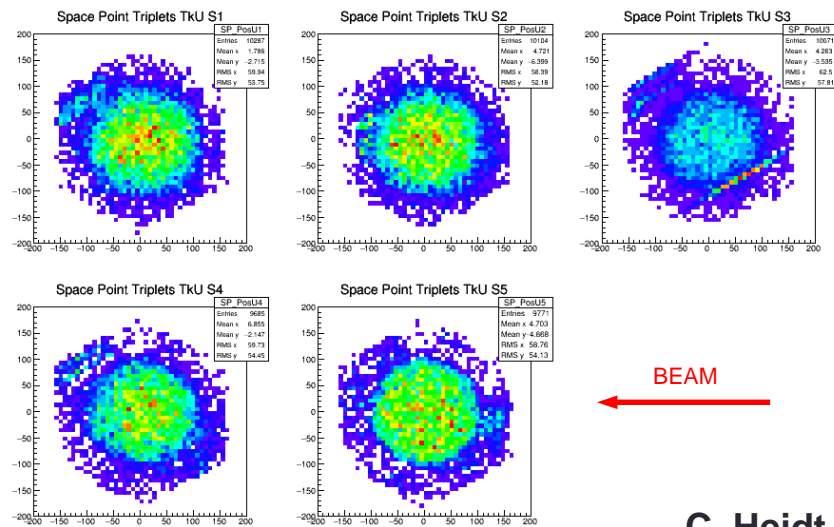
Right



Operations Jun/Jul

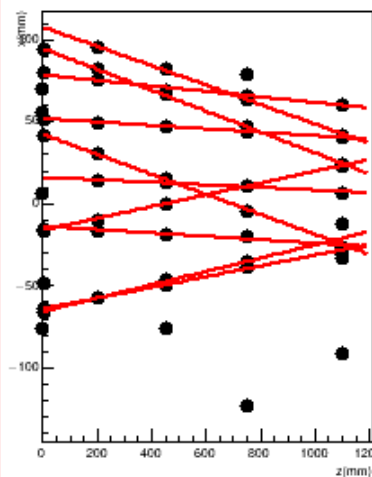
- **User Run 2015(01a); June/July:**
 - 8 hour operation
 - 1 (2-person) shift, 22:00—06:00
- **User Run 2015(01b); July**
 - 24 hour operation
- **Goals:**
 - **2015(01a): commissioning:**
 - Trackers with beam;
 - Spectrometers and focus-coils
 - **Cool-down (for purification of hoses):**
 - FC started 19Jun15;
 - SSs to be started asap
 - **2015(01b):**
 - Data for alignment of channel

Beam Profile



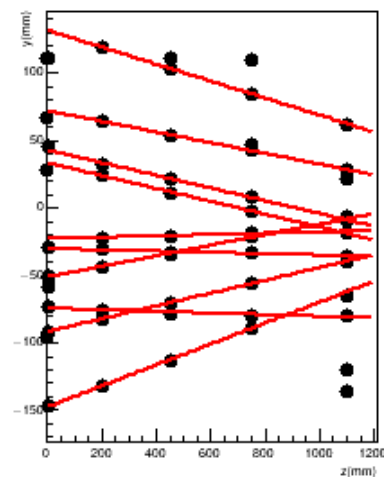
C. Heidt

Tracker 1 Z-X Projection



A. Dobbs

Tracker 1 Z-Y Projection



- [illegible]

- **Enormous amount achieved!**
 - **Fantastic team effort!**
 - **MOMs:**
 - P. Hanlet (Feb); Y. Karadzhov (Apr);
M. Popovic (April);
V. Blackmore (May)
 - Deputy MOMs (KL, A. Dobbs, R. Gamet)
 - **Tracker experts:**
 - E. Overton, M. Uchida, C. Heidt
 - **Controls and Monitoring:**
 - P. Hanlet
 - **Online reconstruction:**
 - R. Gardner, C. Rogers
 - **DAQ, Offline, ...**
 - **MICE Muon Beam and Target:**
 - H. Nebrensky, P. Hodgson, E. Overton, ...



Passing the baton!

- Short-term issues with online and offline monitoring resolved ...
- But:
 - Routine:
 - Storage and update of:
 - Geometry & calibration
 - Batch processing
 - Timely analysis of the data we've taken
- Until we've cracked these, we're dropping the baton!



Introduction

PUBLICATIONS

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 Drafts will be presented at CM41	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 Work organised; now need “goal-oriented” approach	C. Rogers
Ionization cooling demonstration	
Design and expected performance of the MICE demonstration of ionization cooling Lattice frozen (milestone, complete);	V. Blackmore, J. Pasternak, C. Rogers
Technical paper in preparation	
The MICE target upgrade Draft being assembled.	C. Booth
The design construction of the MICE Electron Muon Ranger Draft being assembled.	R. Asfandiyarov, A. Blondel, F. Drielsma
The Reconstruction Software for the MICE Scintillating Fibre Trackers Track fit good! Draft can now be completed.	S. Dobbs
The MICE Analysis and User Software framework	D. Ragaram

Draft being assembled.

Introduction

THIS MEETING

Immediate steps & goal for this meeting

- Milestone:
 - 26Jun15:
 - Step IV complete milestone
- This week:
 - Initial cool-down of cold heads to allow He purification
 - Initiate cool down?
- Target:
 - Start magnet training (SSs): 01Jul15
- Stated start of Step IV production running:
 - Cycle 2015/02:
 - 24Aug15: Run up start
 - 08Sep15: User Run
- Goal for this meeting:
 - For summary:
 - Specification of key dates for MOM to post on “Operations Dashboard”

Introduction

MICE EVENT



Celebration of the start of the MICE study of ionization cooling 25 June 2015

13:30 — Coffee and registration

14:00 — MICE as a step towards cool muon beams for PP

Paul Söler, University of Glasgow

14:25 — How MICE found a home

Alain Blondel, University of Geneva

14:35 — Muon accelerators and the study of the neutrino

Patrick Huber, Virginia Polytechnic Institute and State University

15:05 — Physics at the Muon Collider

Mario Greco, Roma Tre University

15:30 — Coffee

16:00 — Muon accelerators: implementation and technology

Mark Palmer, Fermilab

16:30 — The international Muon Ionisation Cooling Experiment

Chris Rogers, STFC

17:00 — Adjourn

17:30–18:30 — Public lecture: Muons and the mysteries of the neutrino

Ken Kikawa, Institute of Science and Technology Graduate University

18:30–19:00 — Networking reception with wine and canapés

Pickavance Lecture Theatre, STFC Rutherford Appleton Laboratory

To register interest

<https://eventbrite.co.uk/event/16827137421/>



A vision

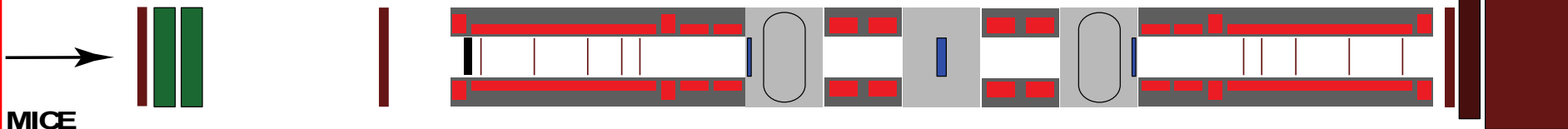
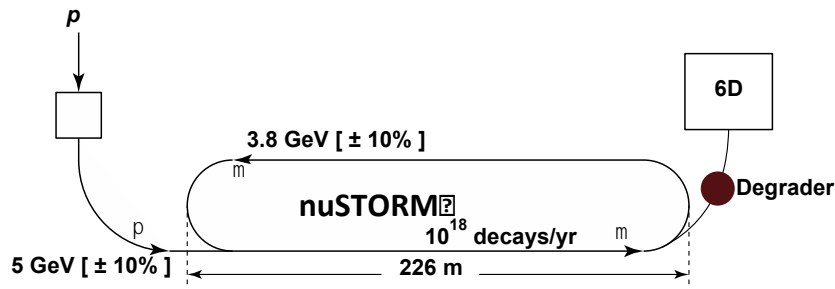
- **Posit #1:**
 - %-level measurement of $\nu_e N$ cross sections will be required
- **Posit #2:**
 - **Neutrino Factory** capability likely required
- **Posit #3:**
 - **Capability to deliver multi-TeV l^+l^- collisions** likely required

A proposal for discussion:

- It is proposed to develop an international team with the aim of designing, financing and constructing the above described cooling muon ring for the Initial Cooling Experiment.
- A campaign of extensive measurements, hopefully confirming the expectations of muon cooling theory could then be performed, starting for instance with a single proton bunch and the CERN-PS accelerator.
- Alternatively, this experiment might be realized either at the Fermilab Booster, at the BNL-AGS or even elsewhere (UK, Switzerland).

FNAL_May 2015

Slide# : 60



7th February 2015

MICE CM42

22-24 June 2015

Rutherford Appleton Laboratory

Europe/London timezone

 Search

WELCOME TO THE MICE CM42 PAGE

Overview

Timetable

Registration

Participant List

Video Conference Rooms

NO FURTHER ACCOMMODATION BOOKINGS ARE BEING TAKEN WEF 17JUNE 2015. BOTH ISIS AND DIAMOND ARE BEAM UP.

The 42nd Muon Ionization Cooling Experiment (MICE) Collaboration Meeting will be held at the Rutherford Appleton Laboratory between the 22nd and 24th June 2015.

Registration £45.00 and Collaboration Dinner - BBQ £25.00

Shift training will take place on the 25th and 26th June 2015.

Debbie Loader

✉ Debbie.Loader@stfc.a..

☎ +44 1235 445338



Starts 22 Jun 2015 08:00

Ends 24 Jun 2015 18:00

Europe/London



No material yet



Main Meeting CR12/13 R68

Break out rooms:

CR09 and CR10 in R26

CR03 R61

• Over to you!