CM 37 meeting goals

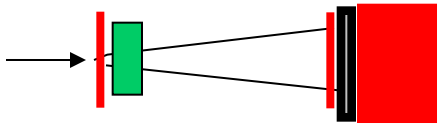
Alain Blondel

Many thanks to V. Blackmore, J. Cobb and A. Nichols !

Provisional MICE SCHEDULE update: June 2013

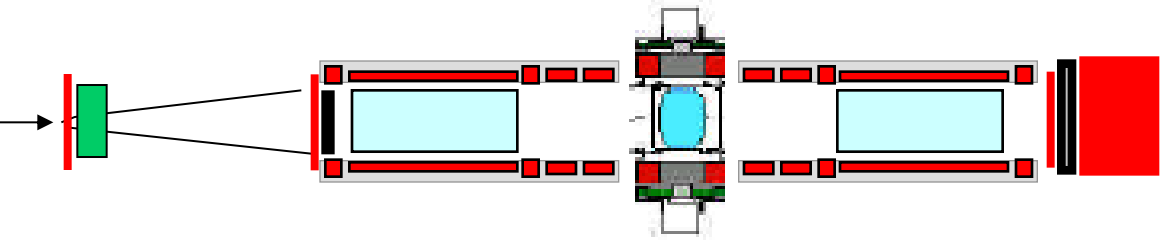
Run date:

μ



STEP I

EMR run Oct 2013



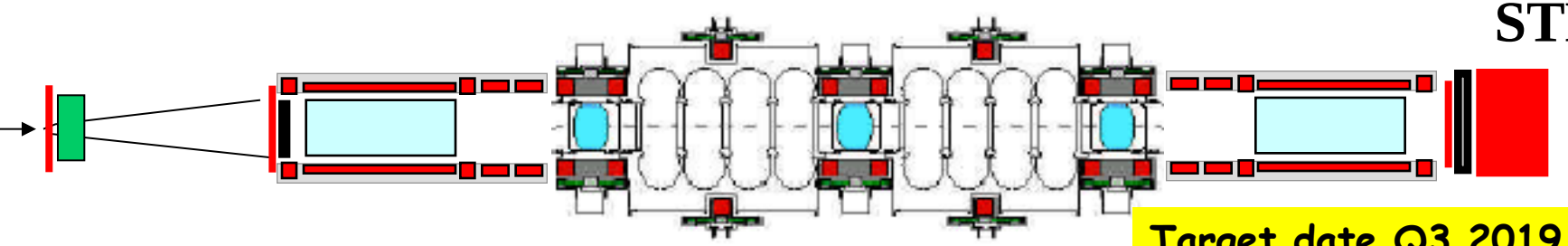
STEP IV

(possibly w/o field: Q2 2014)

Q1 2015 to Q1 2016

Under construction:

STEP VI



Target date Q3 2019
Step V run possible 2018

CM37: we need to update this!

Slip since october 2012 = 2 months

Expect for (≅ agenda of) next CM

1. Answers to RLSR and MPB

2. EMR test run and several beam-related tests
   -- alignment of quads
   -- understand/model rate dependence
   -- further refine understanding of beam

3. Spectrometer solenoids both at RAL !
   analysis of magnetic field maps.

4. AFC issue understood and way forward

5. Decided and moving forward with magnetic field mitigation

6. Ready to reach 2MW with RF amplifier

7. Organization for running the experiment

General picture at CM36 in Chicago

1. SS2 now operational and being mapped ! arrives at RAL in July.

2. AFC is having trouble reaching design current for flip mode β= 42cm 200 MeV/c

   -- situation is delicate because normal action is to send back to vendor
   -- will see what second module does before making firm decisions
   -- however it is clear that safety margin on this magnet is very small given that the magnet will be embedded in a magnetic channel which may worsen things.
   -- in principle we could imagine running with higher beta values in flip mode (asked C. Rogers to evaluate) ****→

3. EMR construction nearing completion and first tracks seen
   -- lots more to do;
   -- run in September-October (also allows decay solenoid to be operational)

4. Coupling coil
   -- cryostat construction started !
   -- but coil 1 test has been delayed by He leak.

General picture at CM36 in Chicago

1. SS2 now operational and being mapped ! arrives at RAL in October!

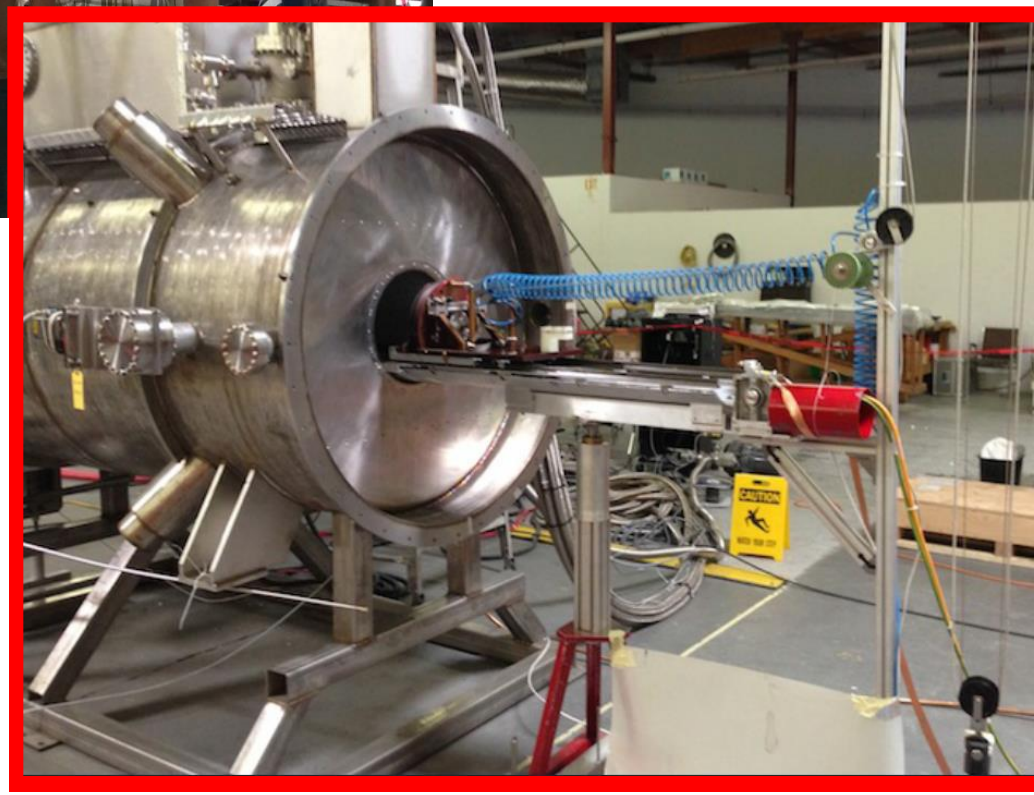
2. AFC1 is having trouble reaching design current for flip mode β= 42cm 200 MeV/c

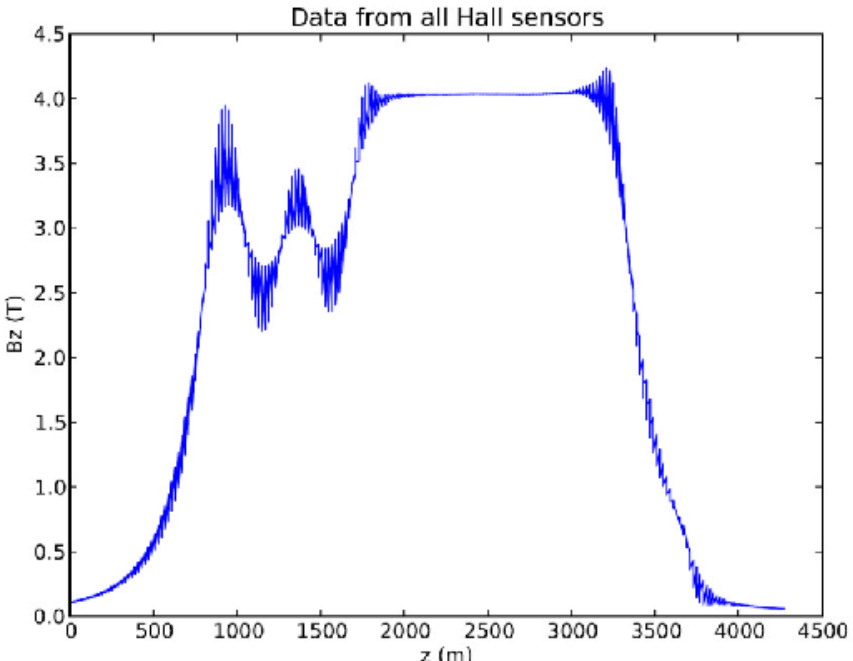
   -- situation is delicate because normal action is to send back to vendor done, AFC2 arrived
   -- will see what second module does before making firm decisions
   -- however it is clear that safety margin on this magnet is very small given that the magnet will be embedded in a magnetic channel which may worsen things.
   -- in principle we could imagine running with higher beta values in flip mode (asked C. Rogers to evaluate) ****→ One of the important point for this meeting

3. EMR construction nearing completion and first tracks seen
   -- lots more to do;
   -- run in September-October (also allows decay solenoid to be operational)

4. Coupling coil
   -- cryostat construction started !
   -- but coil 1 test has been delayed by He leak.

EMR run successful but... no decay solenoid



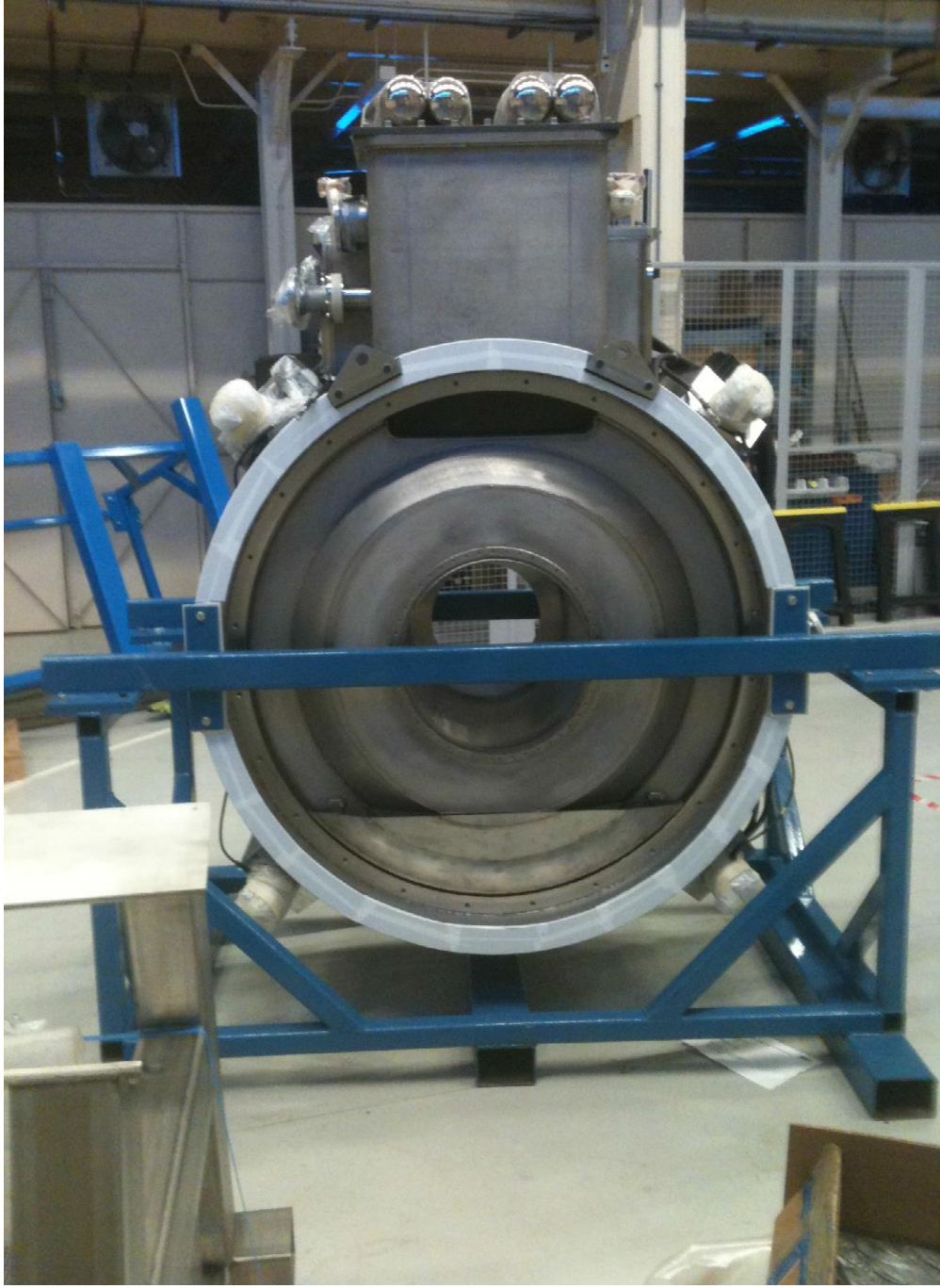

Data from all Hall sensors
Bz (T)
z (m)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
0
500
1000
1500
2000
2500
3000
3500
4000
4500

MICE CM36 – wrap up Alain Blondel

AFC2 at RAL

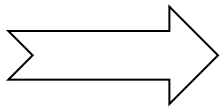
John Cobb: "it looks just like #1"

AFC1 did not pass the acceptance criteria and will be sent back to Tesla



- EMR was shipped on September 24th
- arrived at RAL on September 26th

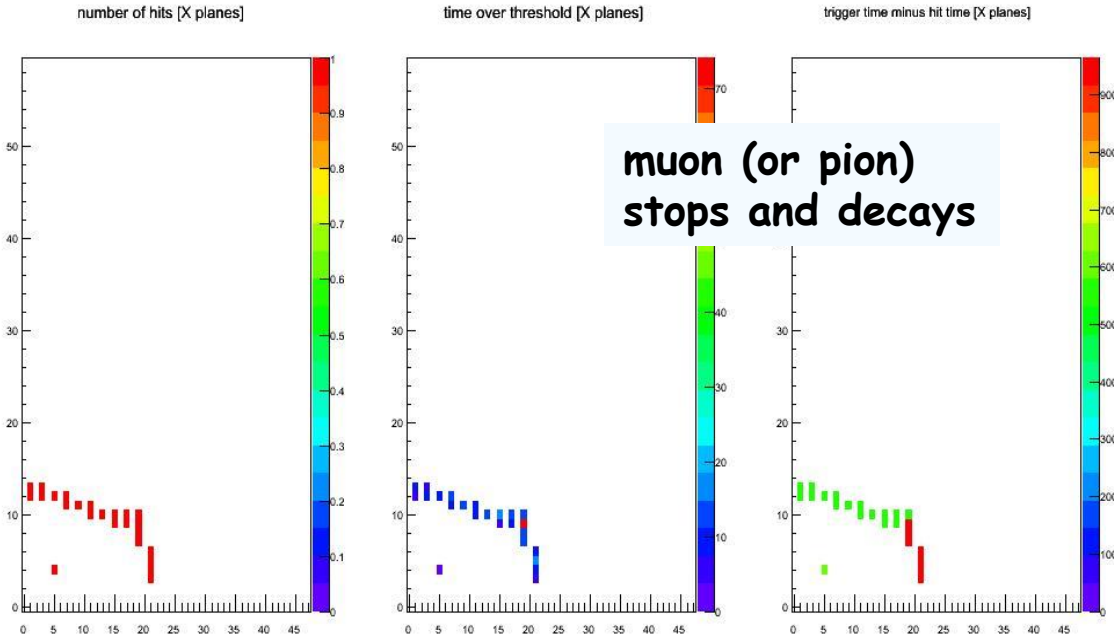
MICE beam

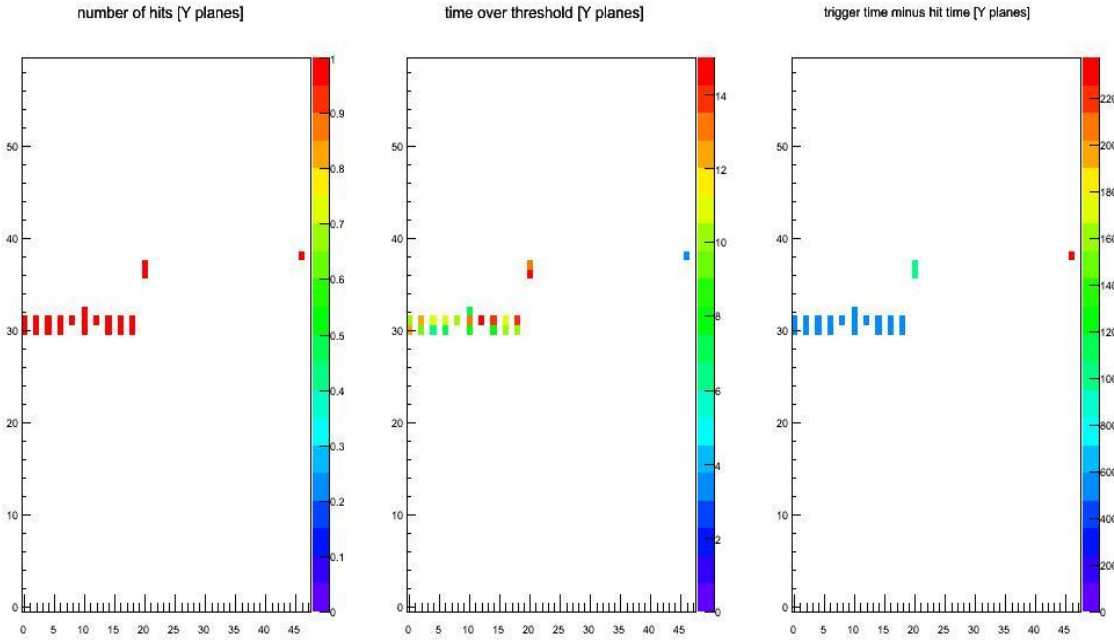


Successful run in Oct'13
(but rate limited because no DS)

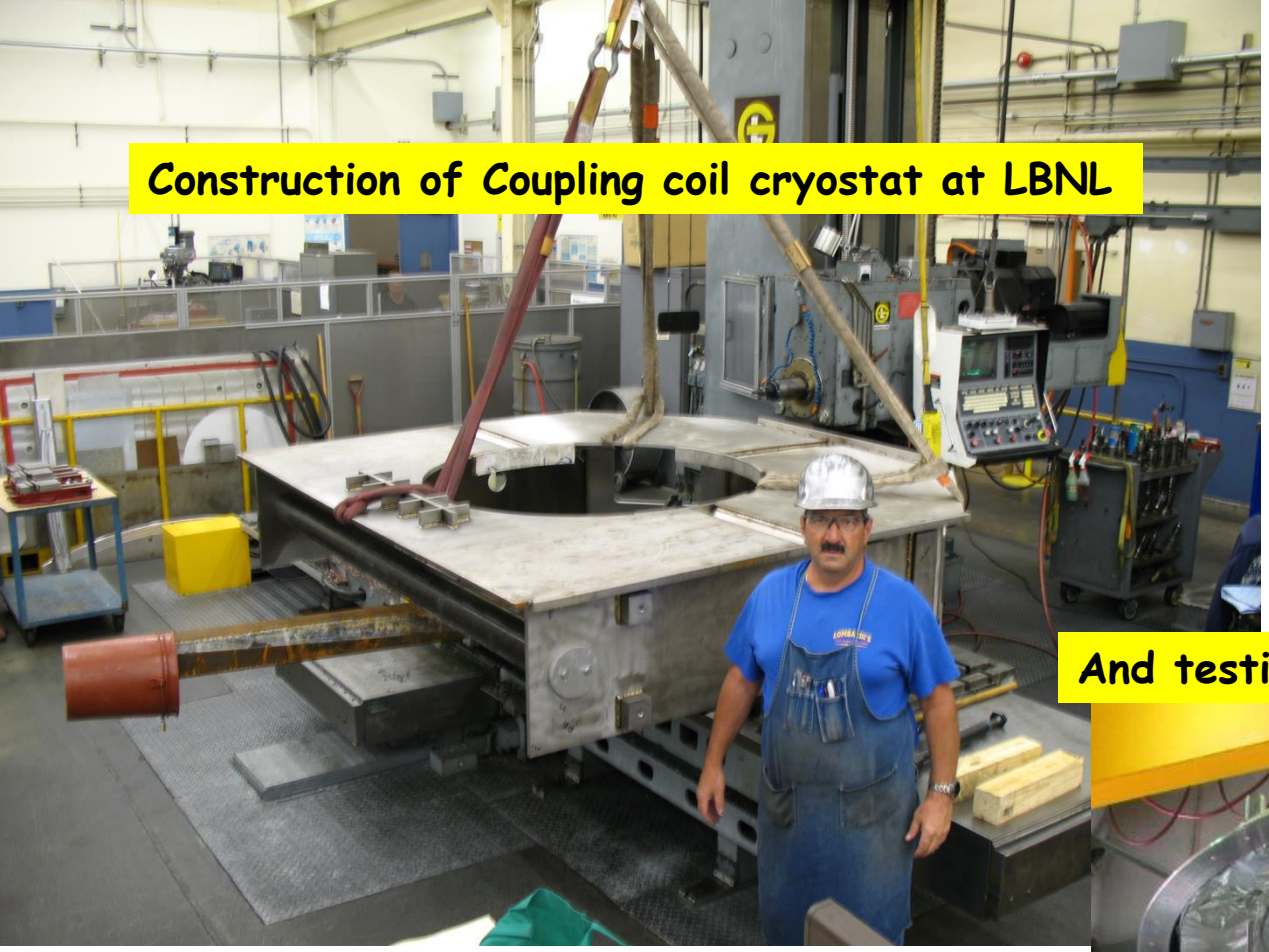
Many thanks to MOMs,
shifters, and to Andy Nichols
for being accommodating
for scheduling hall work
and data taking in a smooth
fashion.

more at this meeting

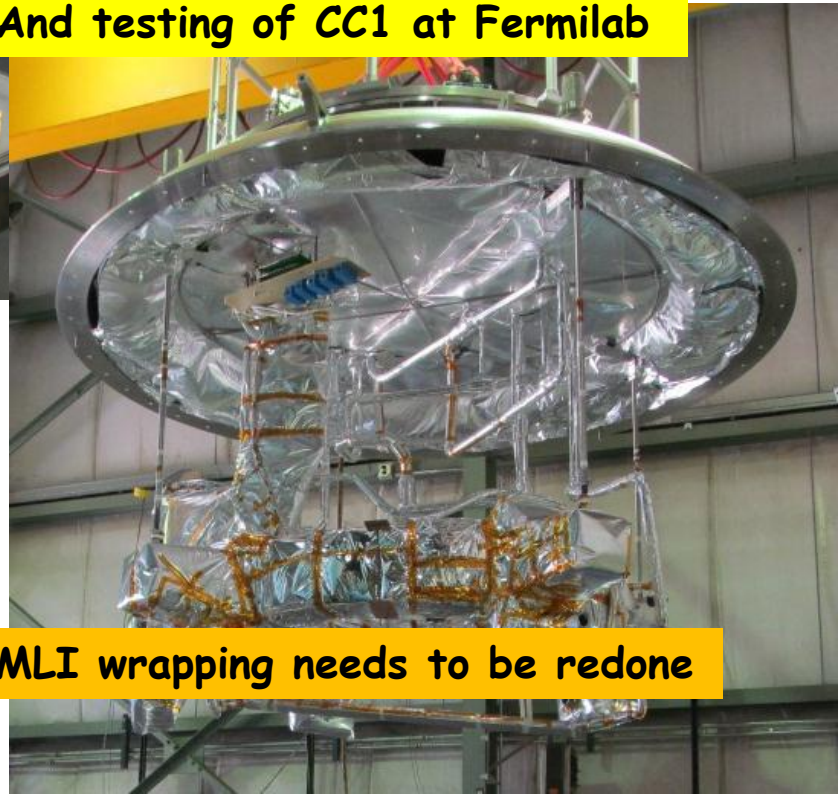




Construction of Coupling coil cryostat at LBNL



And testing of CC1 at Fermilab



hmmm, MLI wrapping needs to be redone

RF amplifier from Daresbury

First amplifier installed

Simplified TIARA configuration accepted by RF group
- **powering into one load reduces stress on deadline and uses fewer components and decouples from mods to mezzanine floor.**

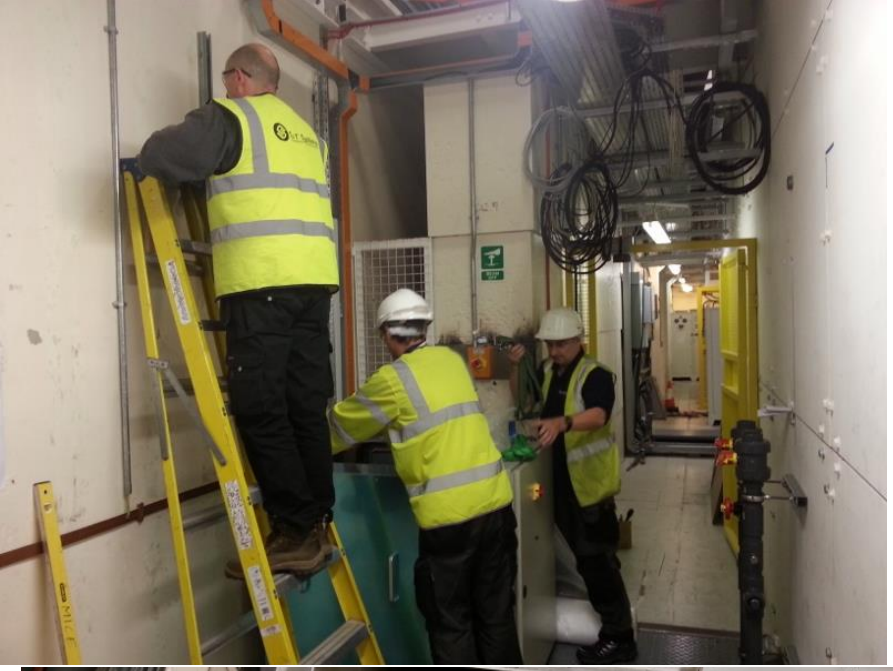
Waveguides and dummy load components received from UMISS

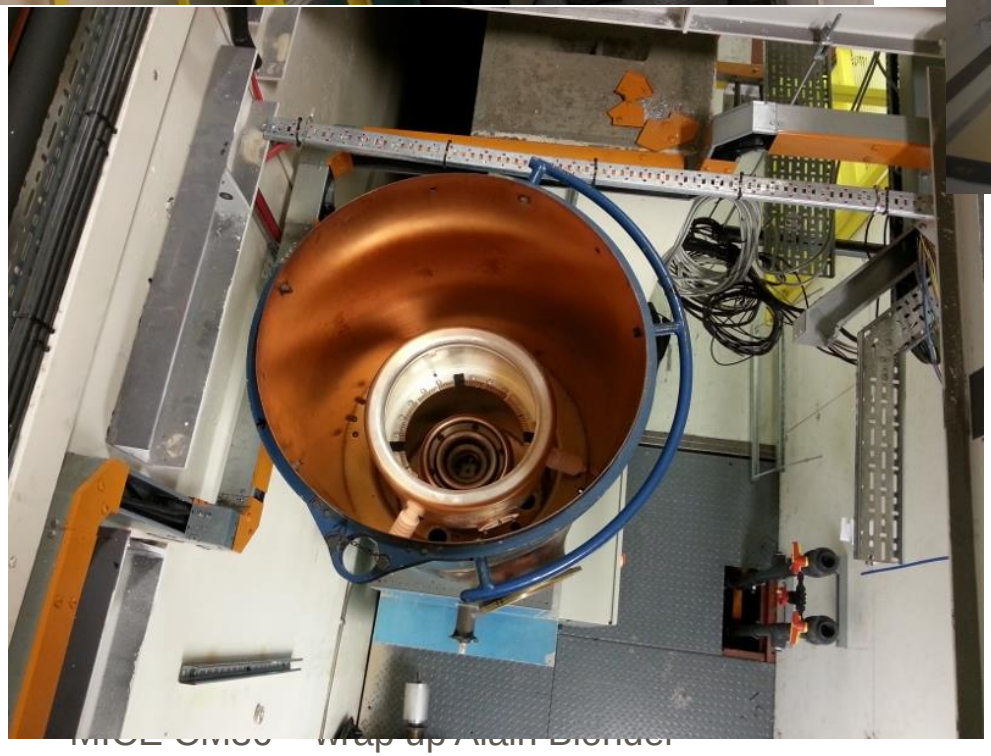
Prefabricated water panel arrived from DL

Air system components are all here,

Installation after EMR run #2

More on this this week!





Dear MICE,

I'm sure you'll all be very happy to hear that the emittance paper has now been published in EPJC, and is viewable at

http://dx.doi.org/10.1140/epjc/s10052-013-2582-8
http://link.springer.com/article/10.1140%2Fepjc%2Fs10052-013-2582-8

Many, many thanks to everyone who helped get it there!

Best,
Victoria

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The European Physical Journal C
October 2013, 73:2582,
Open Access

Characterisation of the muon beams for the Muon Ionisation Cooling Experiment

D. Adams, D. Adey, A. Alekou, M. Apollonio, R. Asfandiyarov, J. Back, G. Barber, P. Barclay, A. de Bari, R. Bayes, … show all 146

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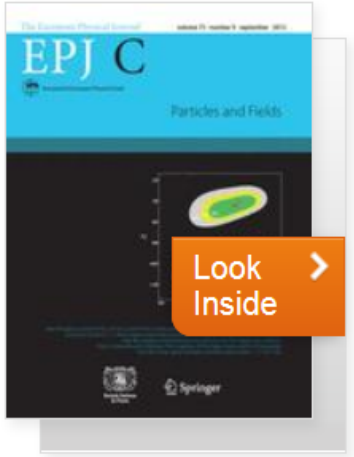


Abstract

A novel single-particle technique to measure emittance has been developed and used to characterise seventeen different muon beams for the Muon Ionisation Cooling Experiment (MICE). The muon beams, whose mean momenta vary from 171 to 281 MeV/*c*, have emittances of approximately 1.2–2.3 π mm-rad horizontally and 0.6–1.0 π mm-rad vertically, a horizontal dispersion of 90–190 mm and momentum spreads of about 25 MeV/*c*. There is reasonable agreement between the measured parameters of the beams and the results of simulations. The beams are found to meet the requirements of MICE.

Share

Within this Article

A small boring remark:

For planning purposes: do use the ISIS schedule that is on the MICO page
-- excel spread sheet directly obtained from ISIS director and containing
  -- run-ups
  -- Machine Physics
  which are relevant for dates when DSA can/cannot be open

and *not* the ISIS official schedule
http://www.isis.stfc.ac.uk/beam-status/beam-status4463.html
which only includes the ISIS user runs

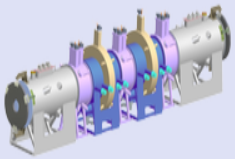
➔ the Xmas shut down usable for DS repair is only 23 december to 26 January
(and not 20 December 2013 to 11 February 2014)

➔ the long ISIS shut down begins 18 August 2014 until 1st Feb 2015
(and not 15 August 2014 till 9 March 2015)

mice.iit.edu/mico/

MICO

MICE Installation, Commissioning and Operations



Logbook
MICEmine: Operations

Important Email Addresses: Principal Contractor MOM

Information:

- Visitors to RAL
- Guide to MICE Computing at RAL
- Next meeting (October 30, 2013)
- Hall photo of the day — photo album
- Web Cameras
- ISIS Scopes
- Tips for access to RAL
- Expert Phone List PDF
- Decay Solenoid Archive only available from RAL.
- Cerenkov page only available from RAL.

Standing instructions for MICE operation:

- Safety Information
- Search procedure PDF
- Safety documents for use of tools in controlled areas and risk assessment
- Manuals and Operating Instructions
- Instructions for Shifters

MICE run/shift plans and results:

- Status of MICE Hall Access (last updated 10th June 2010)
- Example request for data taking (updated 2nd March 2010)
- Run Plan Repository
- Config DB Viewer and Run conditions summary (last updated - 21st Oct 2013)
- Data files via IC webserver or Grid WebDAV
- Archive
- Results, Plots, etc

Schedules, rotas, and shift lists:

YES, THIS ONE

- ISIS schedule
- MOM Shift Schedule
- MOMs, ISIS and MICE acivities EXCEL PDF
- Shift Schedule (2011)
- Beam line Expert Rota Responsibilities Team
- DL Electrical Schedule
- ISIS Status

ISIS running schedule — 2013–2015 IMC/P57/13

At 06-Aug-13 Scenarios: 120 and 150 days for 2013–14

After IMC discussion round on 06-Aug-13.

Cycles begin 08:30 Tuesday, end 8:30 Friday

Days - Nominal days includes maintenance days, Days - Actual & Cumul. days does not

Cycle no.	Start		Finish		Days Nominal	Days Actual	Days Cumul.	Moderator changes and cumulative days mod. TS-1		TS-2		
	lundi	01.avr.13	dimanche	28.avr.13	28					TS-2		Shutdown (incl. TS-2 moderator change)
	lundi	29.avr.13	dimanche	12.mai.13	14							Run-up + machine physics
	lundi	13.mai.13	lundi	13.mai.13	1							Ion source change, beam line permits, etc.
2013/01	mardi	14.mai.13	jeudi	13.juin.13	30	30.6	30.6		68		31	Cycle 2013/01
	vendredi	14.juin.13	dimanche	16.juin.13	3							Machine physics
	lundi	17.juin.13	dimanche	30.juin.13	14							Shutdown
	lundi	01.juil.13	dimanche	14.juil.13	14							Run-up
	lundi	22.juil.13	lundi	15.juil.13	-6							Ion source change, beam line permits, etc.
2013/02	mardi	23.juil.13	vendredi	09.août.13	17	17.0	47.6		85		48	Cycle 2013/02
	vendredi	09.août.13	dimanche	11.août.13	3							Machine physics
	lundi	12.août.13	dimanche	01.sept.13	21			TS-1		TS-2		Shutdown (incl. TS-1 and TS-2 moderator changes)
	lundi	02.sept.13	dimanche	15.sept.13	14							Run-up + machine physics
	lundi	16.sept.13	lundi	16.sept.13	1							Ion source change, beam line permits, etc.
2013/03	mardi	17.sept.13	vendredi	01.nov.13	45	44.0	91.6		44		44	Cycle 2013/03 - maintenance day 09-Oct-13
	vendredi	01.nov.13	dimanche	03.nov.13	3							Machine physics
	lundi	04.nov.13	dimanche	10.nov.13	7							Short shutdown
	lundi	11.nov.13	dimanche	17.nov.13	7							Run-up
	lundi	18.nov.13	lundi	18.nov.13	1							Ion source change, beam line permits, etc.
2013/04	mardi	19.nov.13	vendredi	20.déc.13	31	30.0	121.6		74		74	Cycle 2013/04 - maintenance day 04-Dec-2013
	vendredi	20.déc.13	dimanche	22.déc.13	3							Machine physics
	lundi	23.déc.13	dimanche	26.janv.14	35			TS-1		TS-2		Shutdown (incl. TS-1 and TS-2 moderator changes)
	lundi	27.janv.14	dimanche	16.févr.14	21							Run-up + machine physics
	lundi	10.févr.14	lundi	17.févr.14	8							Ion source change, beam line permits, etc.
2013/05	mardi	11.févr.14	vendredi	28.mars.14	45	43.0	164.6		43		43	Cycle 2013/05 - maintenance days 26-Feb-2014 & 12-Mar-2014
	vendredi	28.mars.14	dimanche	06.avr.14	10							Machine physics
	lundi	07.avr.14	dimanche	27.avr.14	21					TS-2		Shutdown (incl. TS-2 moderator change) [Easter 18–21-Apr]
	lundi	28.avr.14	dimanche	04.mai.14	7							Run-up
	lundi	05.mai.14	lundi	05.mai.14	1							Ion source change, beam line permits, etc.
2014/01	mardi	06.mai.14	vendredi	20.juin.14	45	43.0	43.0		86		43	Cycle 2014/01 - maintenance days 21-May-2014 & 04-Jun-2104
	vendredi	20.juin.14	dimanche	22.juin.14	3							Machine physics
	samedi	21.juin.14	dimanche	29.juin.14	9							Short shutdown
	lundi	30.juin.14	dimanche	06.juil.14	7							Run-up
	lundi	07.juil.14	lundi	07.juil.14	1							Ion source change, beam line permits, etc.
2014/02	mardi	08.juil.14	vendredi	15.août.14	38	37.0	80.0		123		80	Cycle 2014/02 - maintenance day 16-Jul-2014
	vendredi	15.août.14	dimanche	17.août.14	3							Machine physics
	lundi	18.août.14	dimanche	01.févr.15	168			TS-1		TS-2		2014 long shutdown (incl. TS-1 and TS-2 moderator changes)
	lundi	02.févr.15	dimanche	08.mars.15	35							Long run-up [nominally 1 week for every month off]
	lundi	09.mars.15	lundi	09.mars.15	1							Ion source change, beam line permits, etc.
2014/03	mardi	10.mars.15	vendredi	17.avr.15	38	38.0	118.0		38		38	Cycle 2014/03 — provisional [Easter 03–06-Apr-15]
	vendredi	17.avr.15	dimanche	19.avr.15	3							Machine physics
			Checks:	#REF!	750							

Cycle

Shutdown and/or moderator change

Mod. change and cumul. days

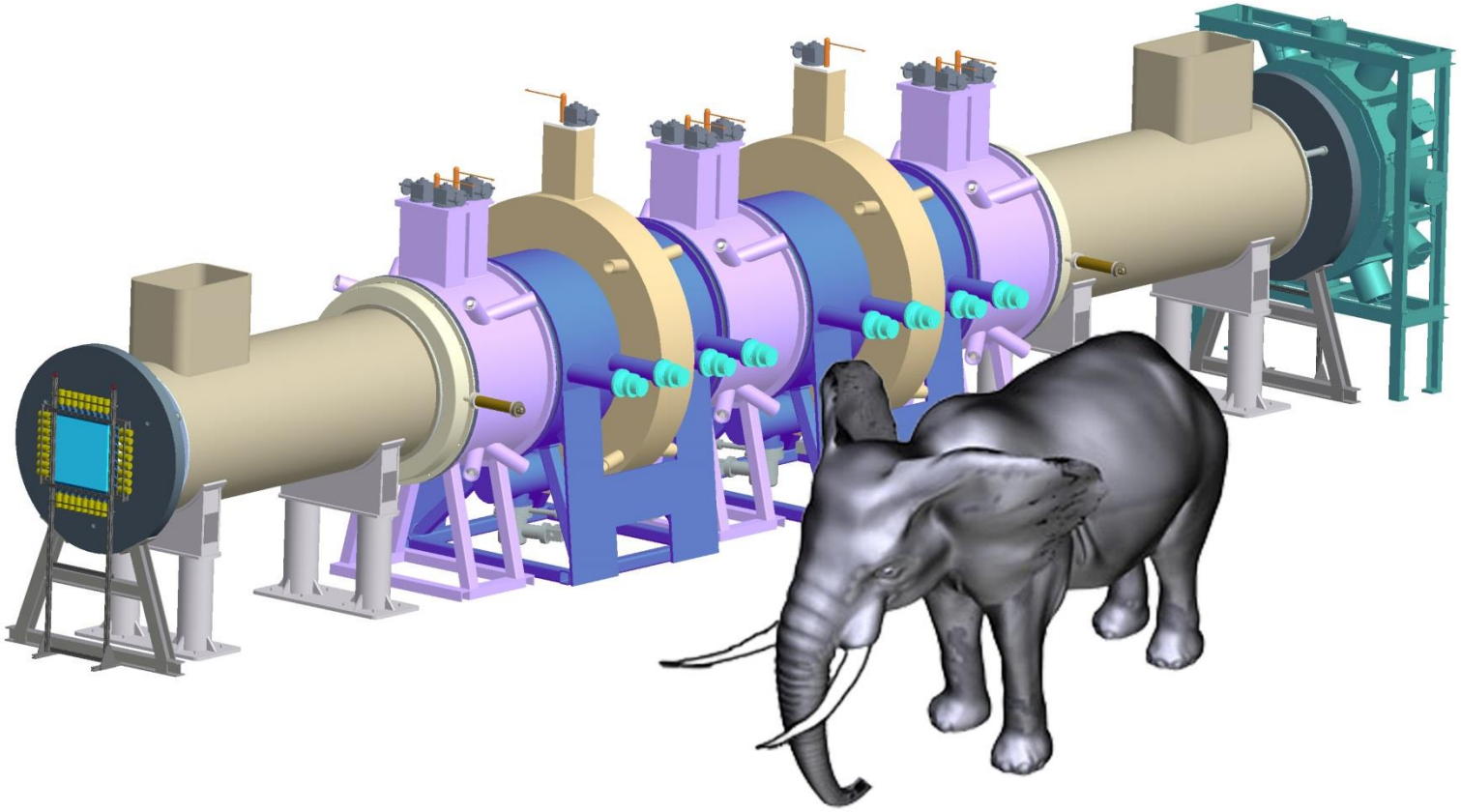
120 days excl. down-time + 75%, 80% and 87.5% = 160, 150 and 137 days scheduled

150 days excl. down-time + 75%, 80% and 87.5% = 200, 188 and 171 days scheduled

MICE chasing the elephants

CM36:

5. Elephant in the Hall: magnetic shielding mitigation



S. Wang, 2005, to scale...

This would not be tolerated today!

from CM36: Important decision points

-1- September 2013: ?installation of return yokes for step IV?

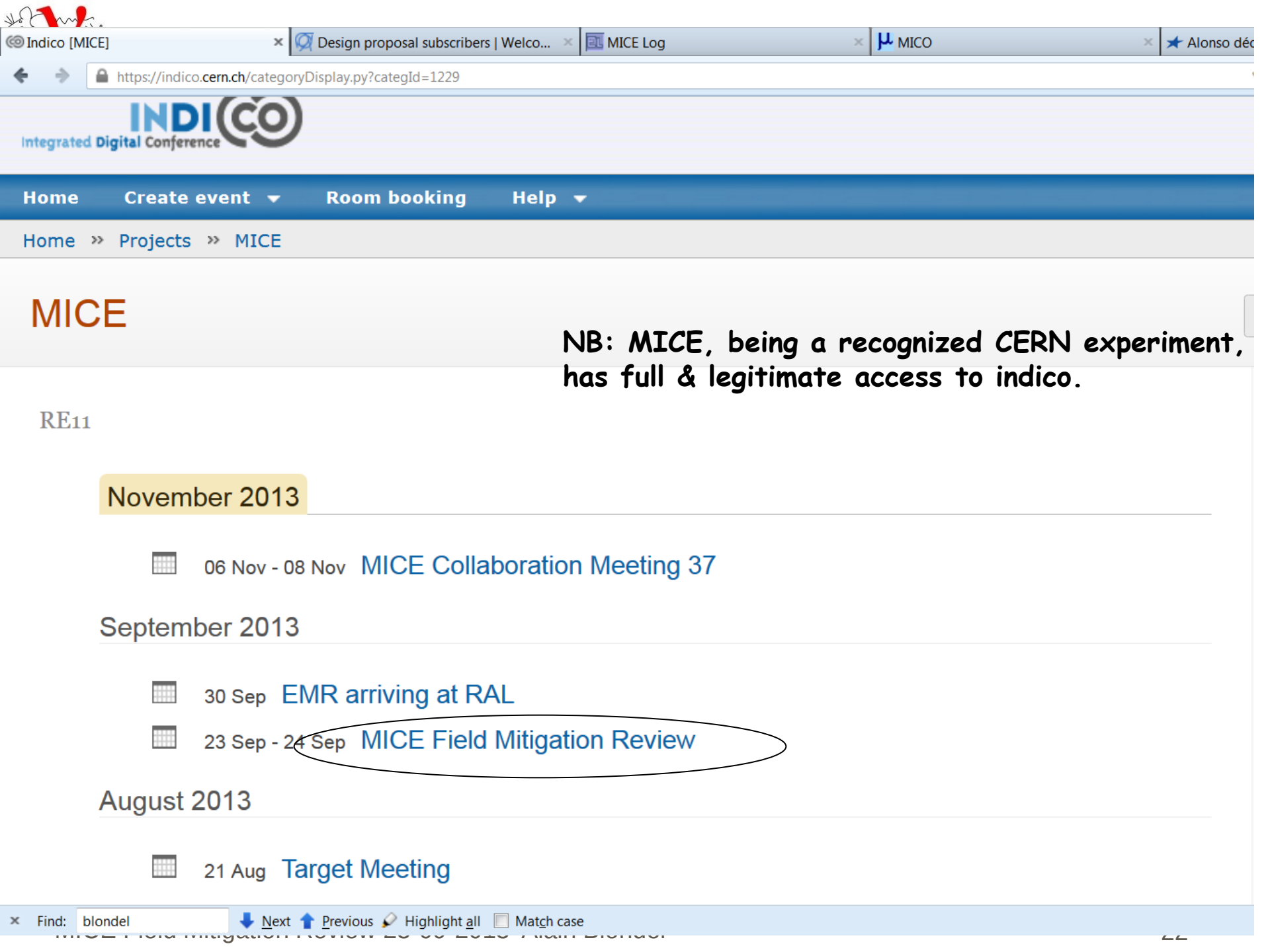
--original motivation of baseline plan is to run step IV before Q3 2014
-- this motivation is no longer there

PLUS:

>> it is not certain that the tracker readout can be properly shielded (cryocooler, electronics) without return yoke solution was presented, but how can we be sure that we did'nt forget something?

My impression from the discussion we had: MICE are leaning towards PRY, with the added value that it leads naturally to a solid solution for step V/VI

<< BUT the cost and schedule implications of yoke implementation need to be understood before we make a decision


Indico [MICE]
Design proposal subscribers | Welco...
MICE Log
MICO
Alonso déc
https://indico.cern.ch/categoryDisplay.py?categId=1229
INDICO
Integrated Digital Conference
Home
Create event
Room booking
Help
Home » Projects » MICE
MICE
NB: MICE, being a recognized CERN experiment, has full & legitimate access to indico.
RE11
November 2013
06 Nov - 08 Nov MICE Collaboration Meeting 37
September 2013
30 Sep EMR arriving at RAL
23 Sep - 24 Sep MICE Field Mitigation Review
August 2013
21 Aug Target Meeting
Find: blondel
Next
Previous
Highlight all
Match case

Collaboration boundary condition that a solution be decided by August 2013 and to hold a review in September 2013. **NOW**.

MICE Project Board requested (as action) the same of us. (May 2013)

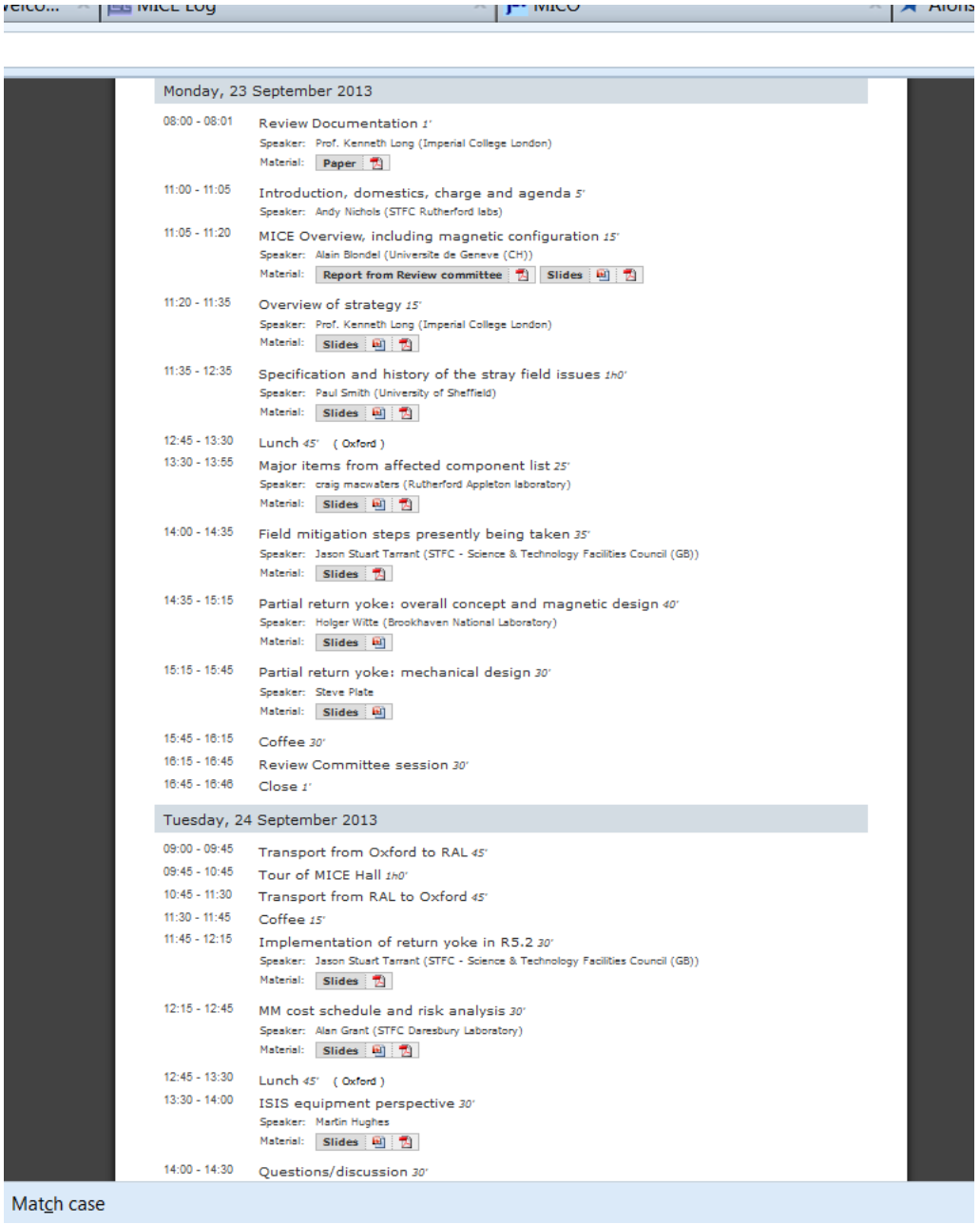
Since then:
-- initial aim of having step IV installed and running usefully before August 2014 is now out of reach in any configuration
-- still not certain that all magnetically sensitive elements can be identified and shielded without PRY

The collaboration :
++ praises the hard work and excellent analysis of the problem by the Magnetic Field Mitigation group
++ endorses the recommendation of PRY implementation

➔ the PRY is the solution that the committee is asked to review today

Possibility to install all step IV equipment for a dry run before August 2014 would be a very welcome asset as it will save time and risk towards step IV

Excellent presentations by MICE team



Monday, 23 September 2013

08:00 - 08:01 Review Documentation *1'*
Speaker: Prof. Kenneth Long (Imperial College London)
Material: Paper

11:00 - 11:05 Introduction, domestics, charge and agenda *5'*
Speaker: Andy Nichols (STFC Rutherford labs)

11:05 - 11:20 MICE Overview, including magnetic configuration *15'*
Speaker: Alain Blondel (Universite de Geneve (CH))
Material: Report from Review committee | Slides

11:20 - 11:35 Overview of strategy *15'*
Speaker: Prof. Kenneth Long (Imperial College London)
Material: Slides

11:35 - 12:35 Specification and history of the stray field issues *1h0'*
Speaker: Paul Smith (University of Sheffield)
Material: Slides

12:45 - 13:30 Lunch *45'* (Oxford)

13:30 - 13:55 Major items from affected component list *25'*
Speaker: craig macwaters (Rutherford Appleton laboratory)
Material: Slides

14:00 - 14:35 Field mitigation steps presently being taken *35'*
Speaker: Jason Stuart Tarrant (STFC - Science & Technology Facilities Council (GB))
Material: Slides

14:35 - 15:15 Partial return yoke: overall concept and magnetic design *40'*
Speaker: Holger Witte (Brookhaven National Laboratory)
Material: Slides

15:15 - 15:45 Partial return yoke: mechanical design *30'*
Speaker: Steve Plate
Material: Slides

15:45 - 16:15 Coffee *30'*

16:15 - 16:45 Review Committee session *30'*

16:45 - 16:46 Close *1'*

Tuesday, 24 September 2013

09:00 - 09:45 Transport from Oxford to RAL *45'*

09:45 - 10:45 Tour of MICE Hall *1h0'*

10:45 - 11:30 Transport from RAL to Oxford *45'*

11:30 - 11:45 Coffee *15'*

11:45 - 12:15 Implementation of return yoke in R5.2 *30'*
Speaker: Jason Stuart Tarrant (STFC - Science & Technology Facilities Council (GB))
Material: Slides

12:15 - 12:45 MM cost schedule and risk analysis *30'*
Speaker: Alan Grant (STFC Daresbury Laboratory)
Material: Slides

12:45 - 13:30 Lunch *45'* (Oxford)

13:30 - 14:00 ISIS equipment perspective *30'*
Speaker: Martin Hughes
Material: Slides

14:00 - 14:30 Questions/discussion *30'*

Match case

Magnetic shielding review panel endorsed MICE proposal... with caveats:

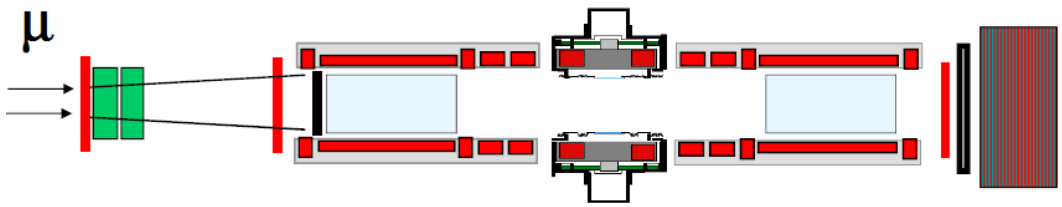
Recommendations

- The committee endorses the strategy of improving the shielding prior to installation of Step IV to avoid the risk of losing beam time due to having to shield individual items.
- The concept of the Partial Return Yoke is sound, and it should perform as required, but some simplification may be possible, and it must be verified that the new shielding does not increase the risk of failure of a magnet.
- FE modelling should continue with the accent on providing information for the specification of the magnetic characteristics and tolerances of the steel shielding components, and on the conceptual shielding for Step VI.
- RAL should consider building a platform on the north side of the [illegible] steel plate on the "weak" concrete, partially supported on sim[illegible]ench) so that the shielding support structure can be identical [illegible].
- The design should be modified to make it [illegible]e the target and access the magnets (e.g. to fix a leak), with[illegible]ntle the mezzanine extension.
- It should be verified that [illegible]g purchased is compatible with the shielding for Step VI. To thi[illegible]d be a conceptual design of the shielding for Step VI.
- A commis[illegible]p IV should be devised to ensure personnel safety when the m[illegible]ched on, and to test that PRY performance is as predicted by the models. [illegible]btained for Step IV should be validated and used to bench-mark the [illegible]ations, so as to refine the result of modelling for the design of the PRY for Step VI.
- In order to converge rapidly on the final design for Step IV it is recommended that Steve Plate (BNL) spend a week with the engineers at RAL.
- A close watch should be kept on the schedule.

Principle has been reviewed and decided.
next steps : implementation, while taking into account comments of review panel

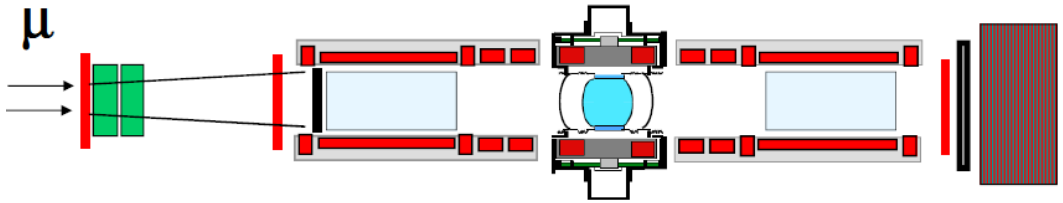
LOOKING FORWARD TO STEP IV

STEP IV EXPERIMENTS (2015-2016)



STEP IV

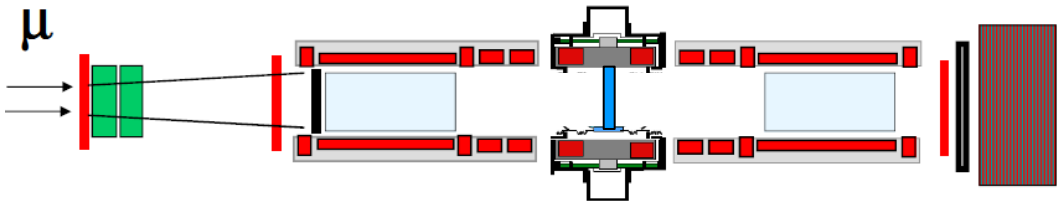
No absorber
Alignment
Optics studies



STEP IV

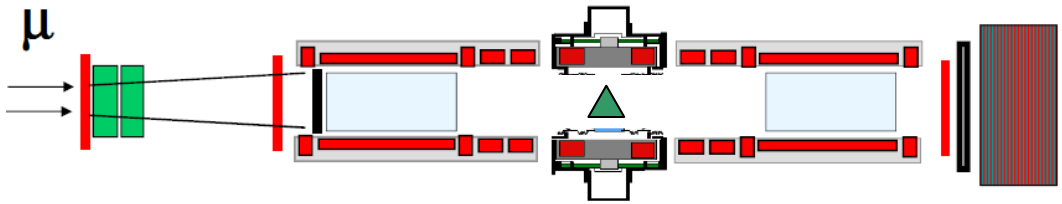
Liq H_2 absorber
(full/empty)

Multiple scattering
Energy loss
➔ Cooling



STEP IV

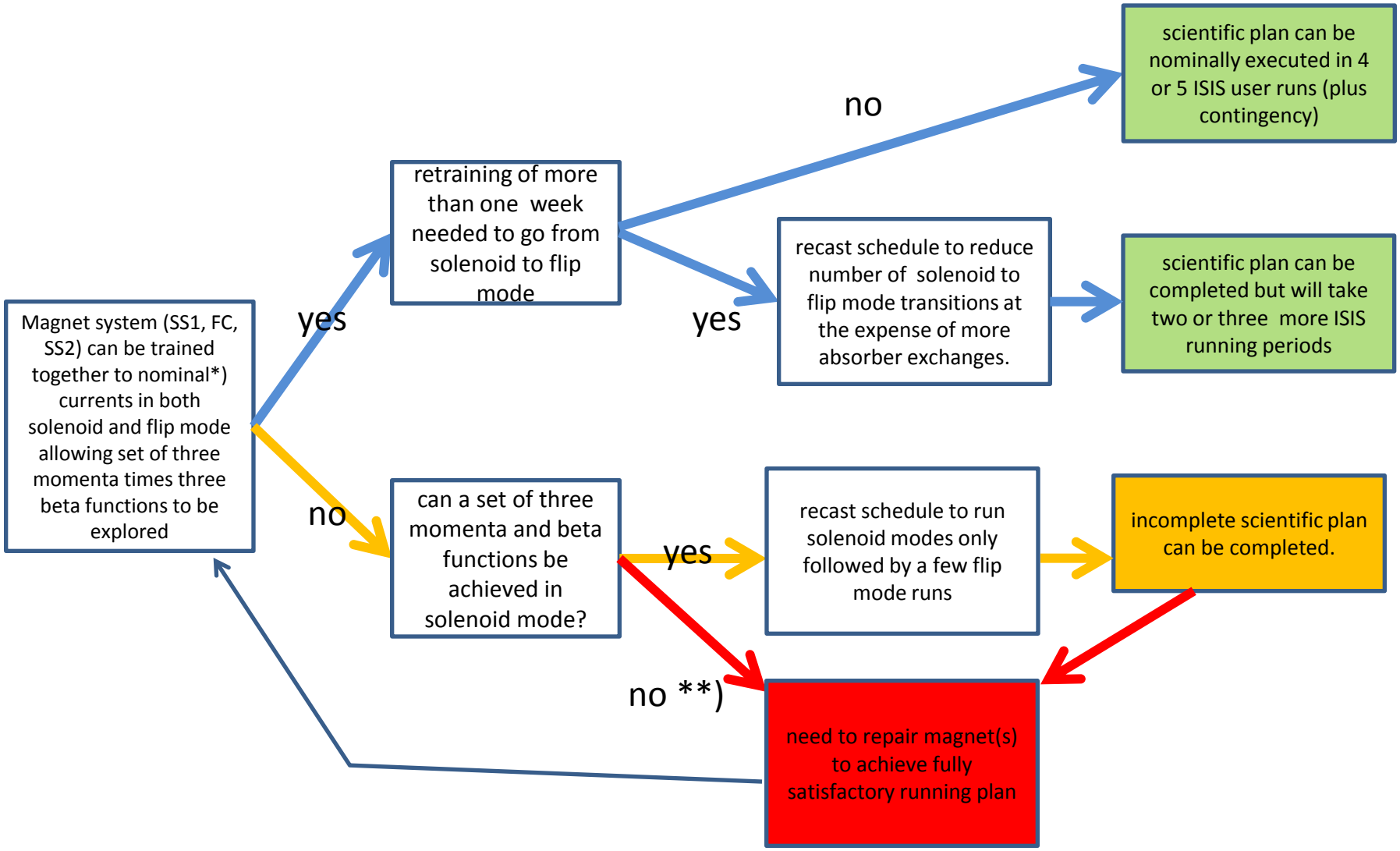
Solid absorber(s)
LiH
Plastic
C, Al, Cu



STEP IV

LiH Wedge absorber
Emittance exchange

HOWEVER ... a lot will depend on what the magnets can deliver
we will know only when the beamline is assembled



*) nominal currents correspond to 200 MeV/c, 42 cm, flip mode optics

**) more precise assessment of the situation is needed before following red routes
(which currents are achieved and what optics can be reached, etc..)

Upcoming Agenda

-- 13 November RLSR
-- 14 November MPB
-- 15 November FAC

see Ken's talk for recall of questions and answers

A lot has happened in the last few months

and this meeting promises to be exciting!