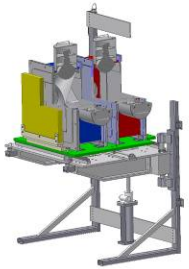
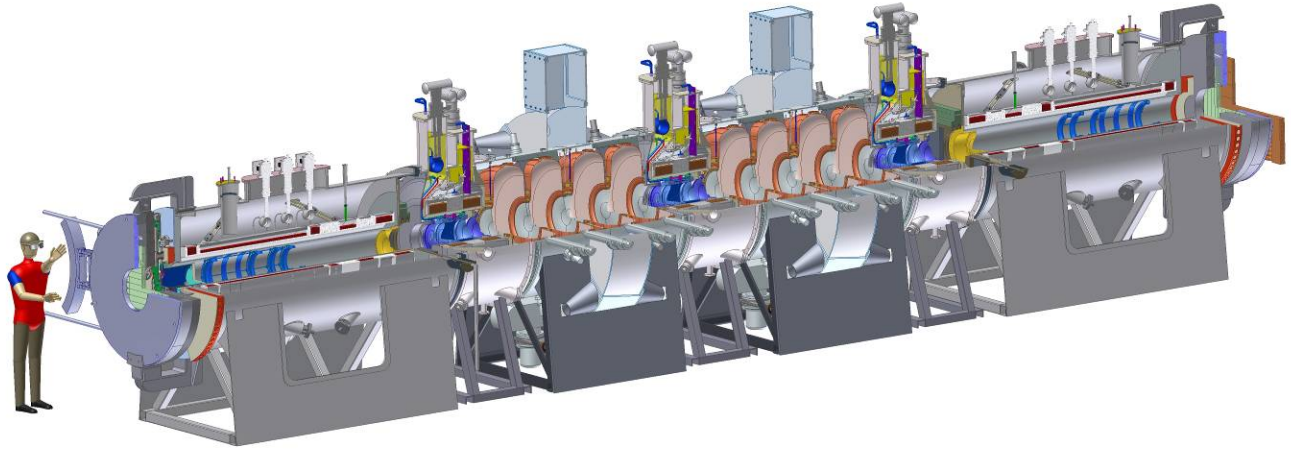
Imperial College London

K. Long, 18 March, 2008

MICE: overview





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- Infrastructure
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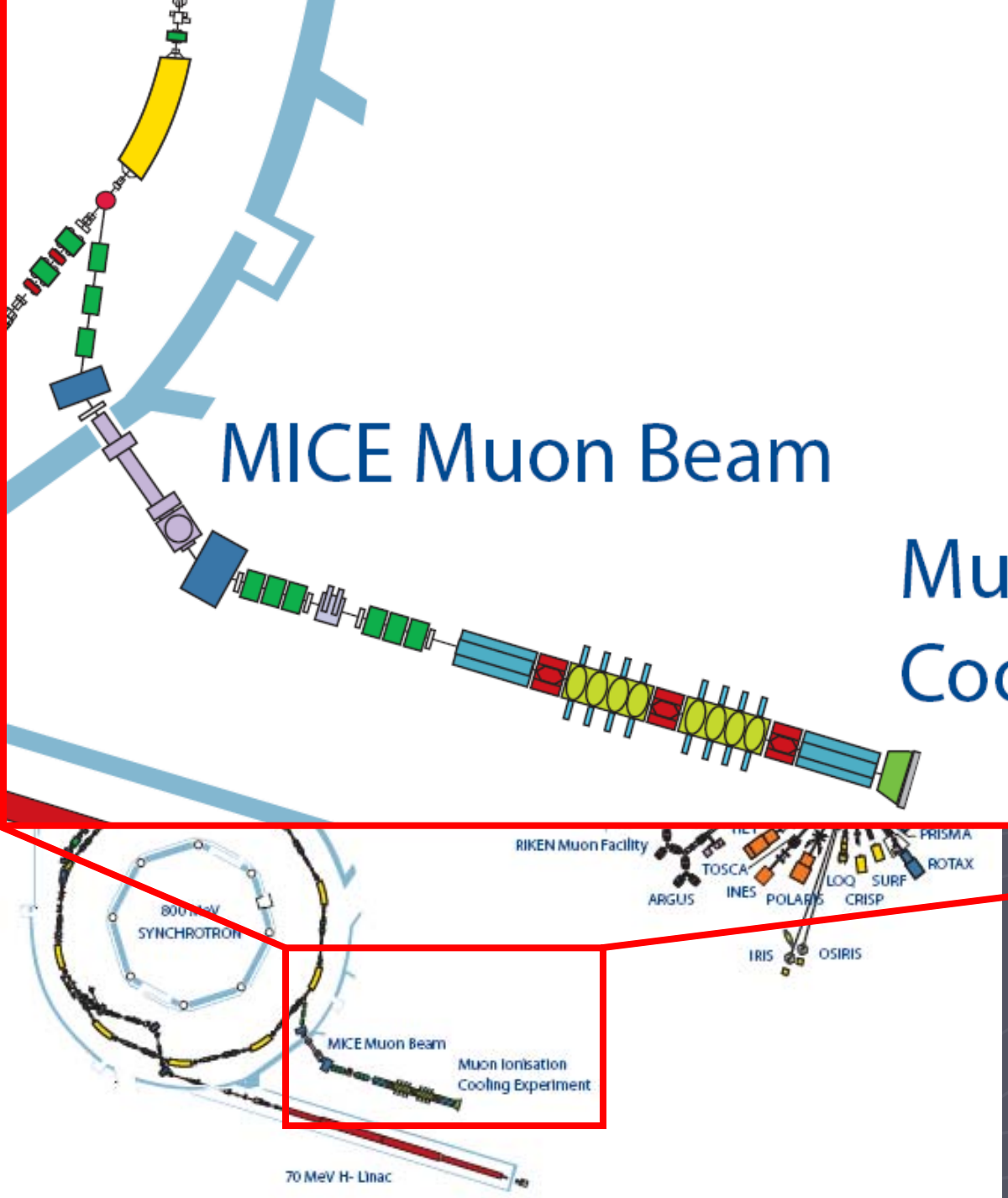
- Conclusions

MICE Muon Beam

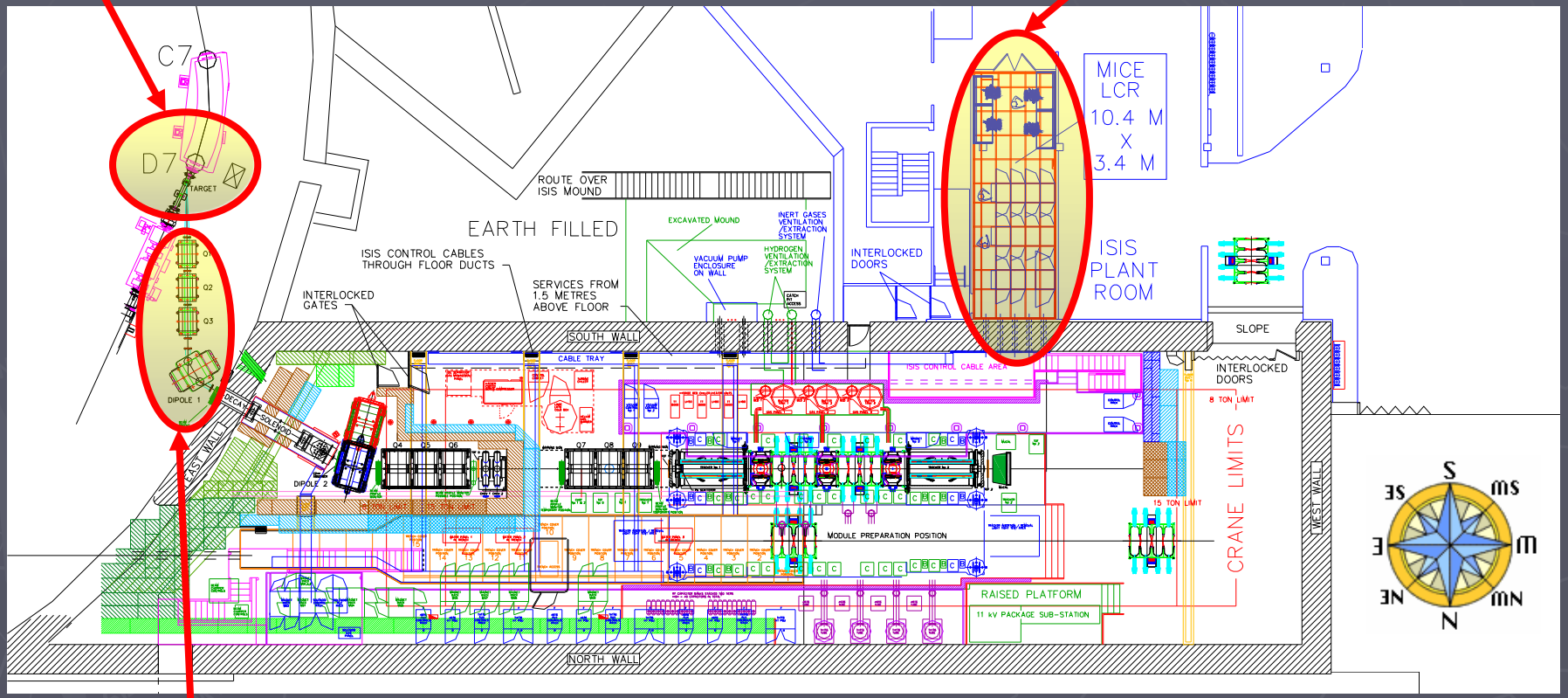
Muon Ionisation Cooling Experiment



Layout of MICE hall

Target

MICE Local Control Room

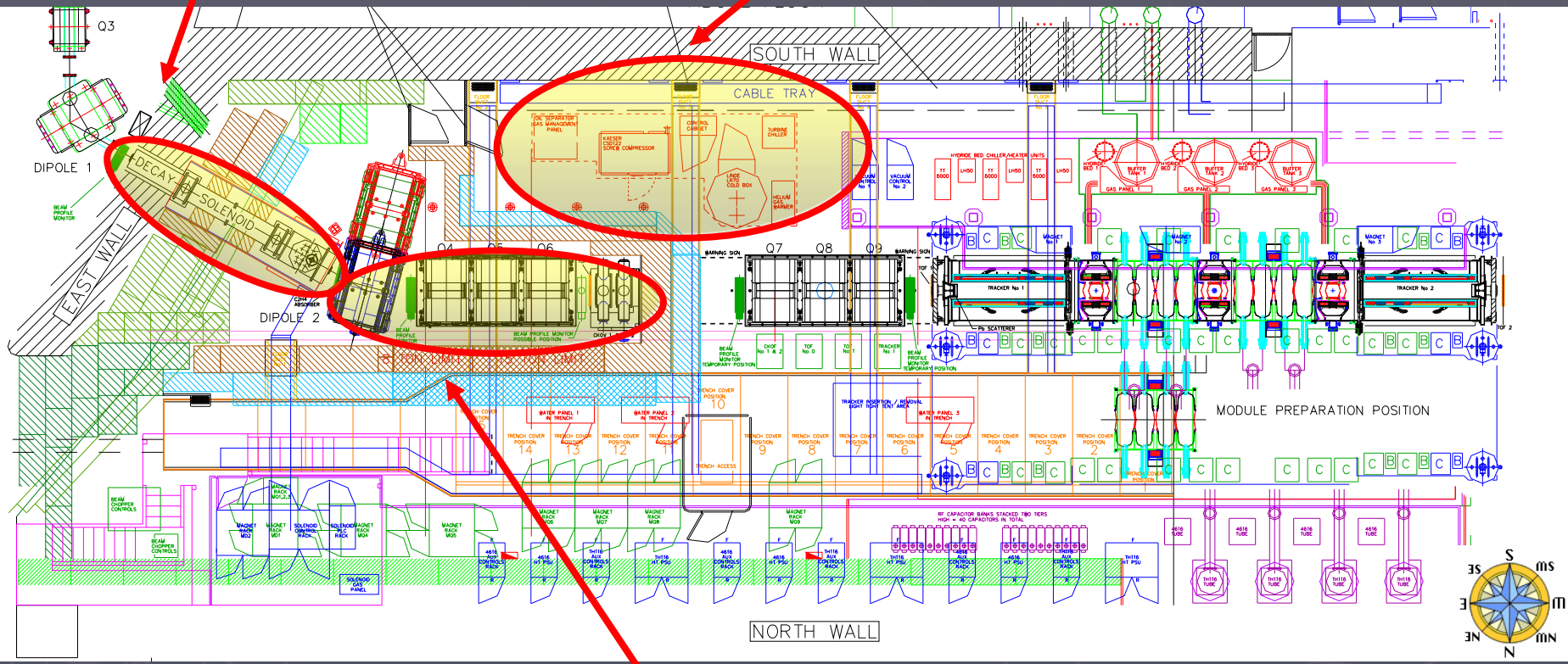


Upstream beamline

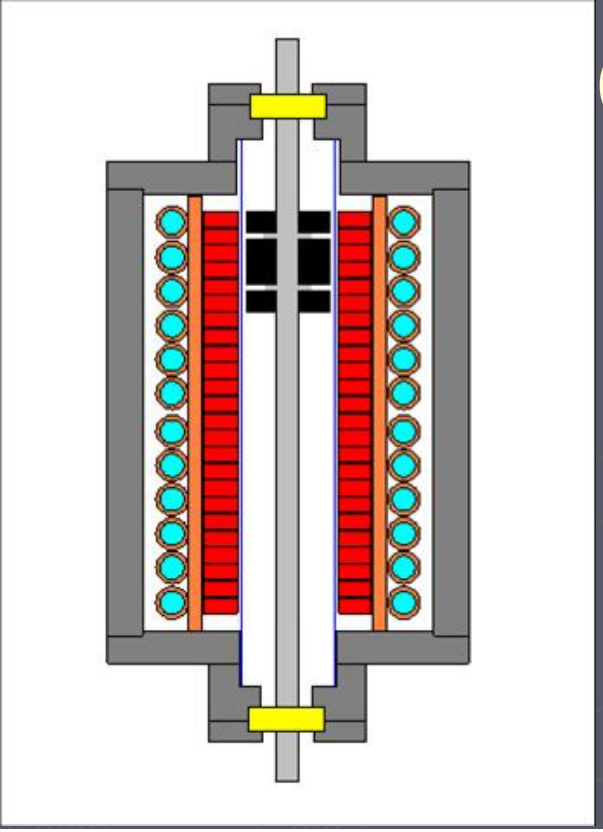
Layout of MICE Hall

Decay solenoid

Linde refrigerator

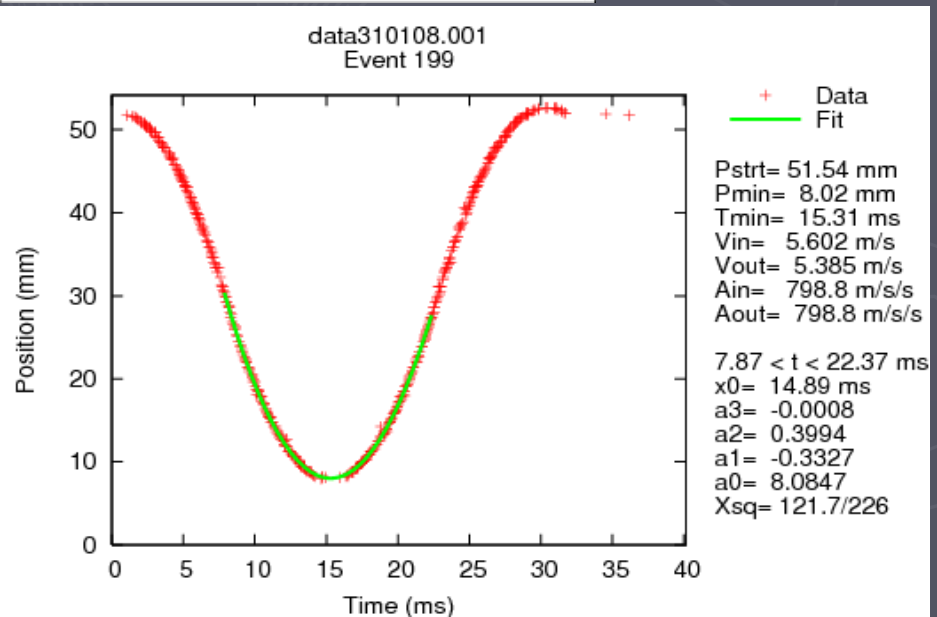


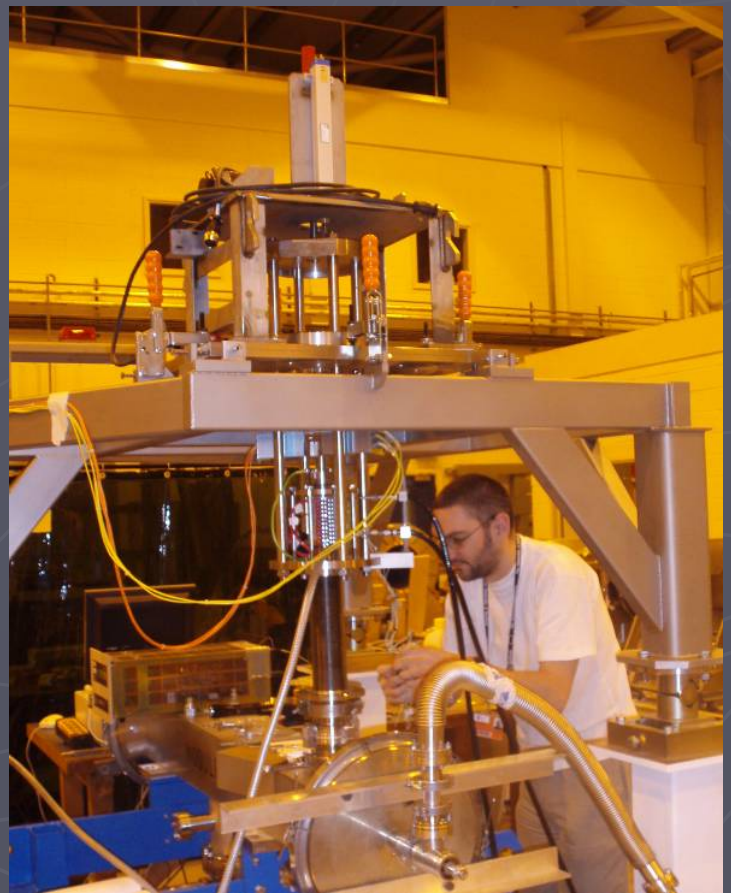
Downstream beamline



eam line: target:

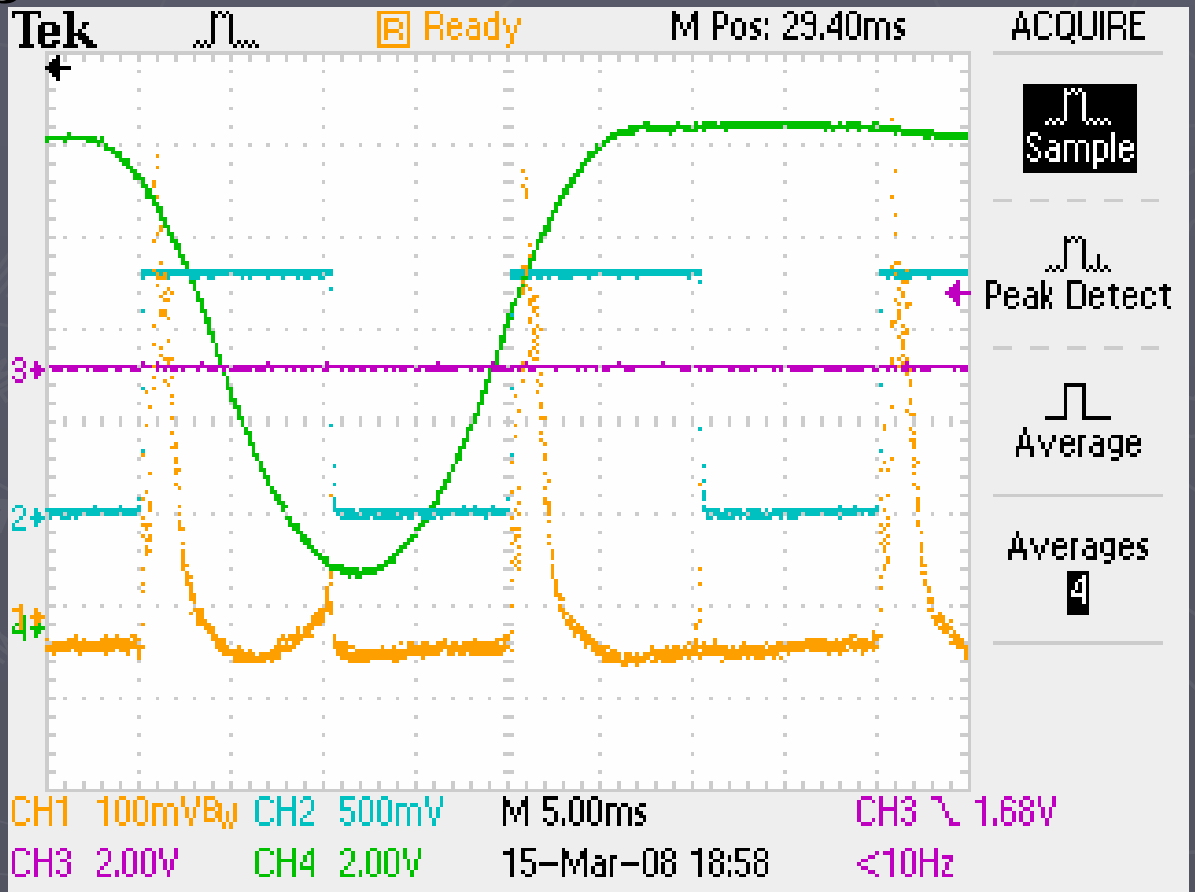
- Linear drive:
  - Accelerates target into beam:
    - Acceleration 80g





Beam line: target

- Successful test Saturday 15Mar08
- Parasitic operation of target established
  - Significant milestone

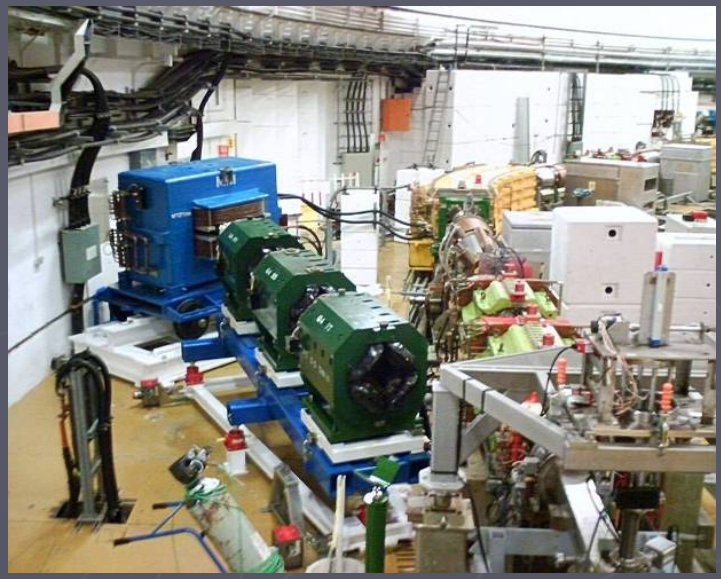


Beam line: second target

- Agreement with ISIS:
  - Two targets, one outside the beam should always have operated three times as ofter as the target in the synchrotron
- Second target:
  - To RAL 13th February and re-assembled in R78.
    - Unusual pulse-to-pulse variation.
    - Failed after ~600 pulses.
    - One coil (of 24) found shorted to ground & burnt out.
      - Internal ground not connected in Sheffield test!
    - Spare stator installed
    - New welded seals at Daresbury last week
    - Brought back to RAL immediately (untested.)
      - All electronics now at RAL.
    - Problems still exist so has now be taken back to Sheffield for further investigation. – see talk by Andy Nichols for latest news
  - N.B. Stator currently in ISIS had done >2M pulses ok.
- Future:
  - Investigating better quality insulation (double layer?) with manufacturer.
  - Need new QA procedures for coil insulation.
  - Target plan will deliver second target to RAL 15May08

Upstream beam line:

- Q1—Q3 and D1 installed, all services connected
  - Issues:
    - Q1, Q2 power supplies damaged by water leak
      - Have been returned to Dan Fysik for repair
    - D1 power supply ‘blew’ resistors in smoothing circuit
      - Spares to arrive from Dan Fysik today
      - Re-install and check source of problem …and correct
- Solenoid in position and packed with shielding



Beam line: refrigerator

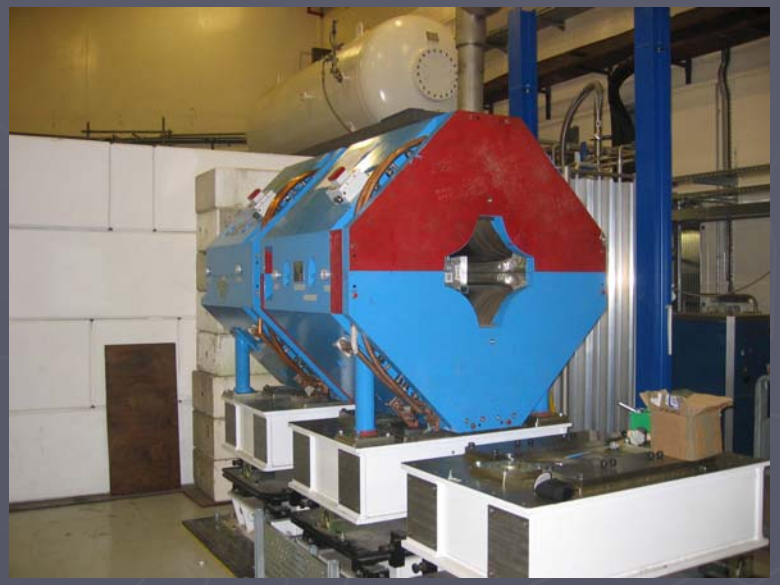
- Linde refrigerator has delivered required cooling power, but:
  - Observed temperature dependence:
    - Diurnal, ‘organ-pipe’ modes, response to external fans
  - Cause traced to compressor: the one supplied does not have sufficient air cooling and must be replaced
- Negotiating with Linde: issues:
  - Schedule:
    - Require to install transfer line in the present shutdown
  - Contractual:
    - Contract says we have to accept frig based on test with dummy load, not with solenoid
  - I believe we can negotiate a ‘middle way’

Beam line in DSA:

- D2 and Q4—Q6 installed and services connected
- Issues:
  - D2 on temporary water:
    - Piping now in place
  - Q4—Q6:
    - Water flow rate needs to be increased

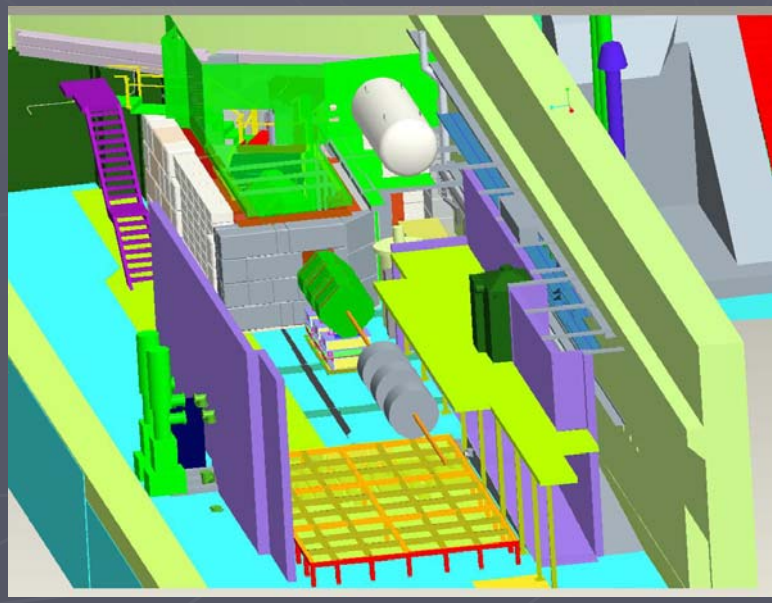
Downstream beam line

- Q7 and Q8 installed and aligned
- Q9 to be installed this week:
  - Issue: water manifold weeps, braze to be effected in MICE Hall
- Water and electrical services to be connected in present shutdown



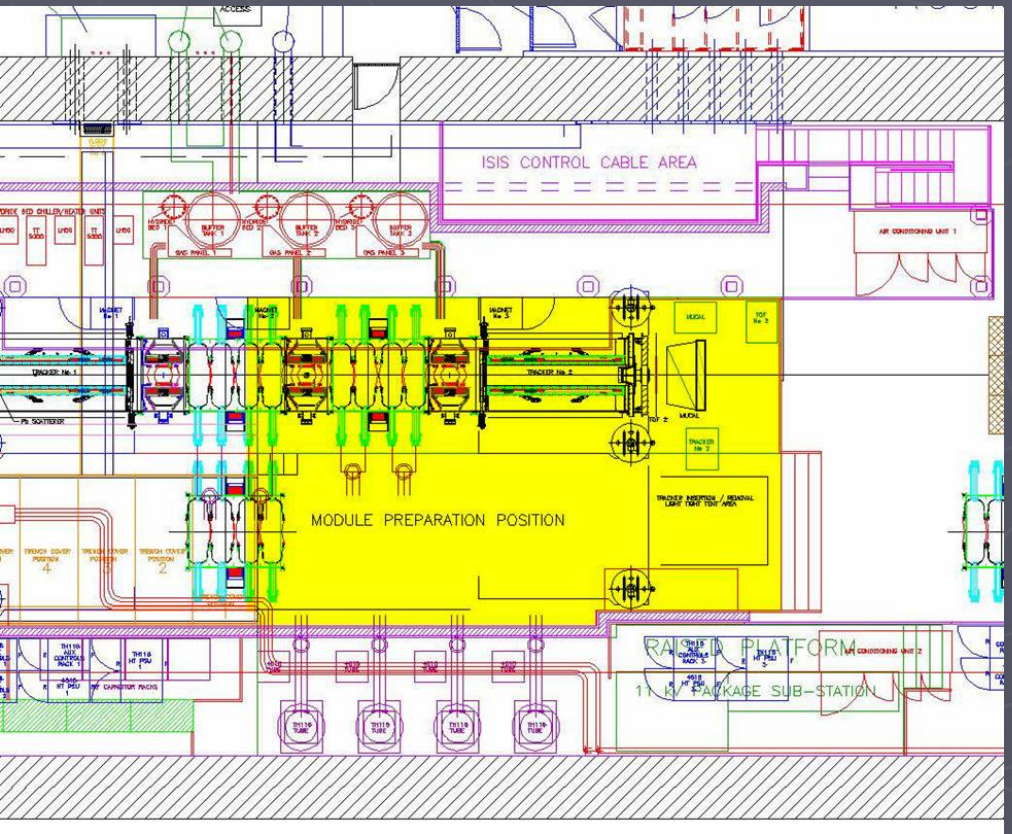
Infrastructure: magnetic shield walls

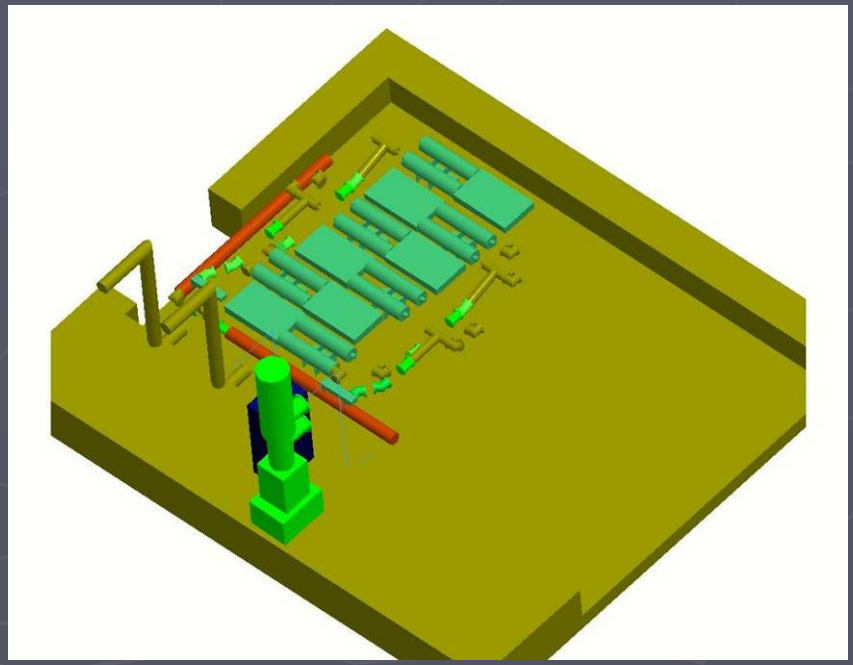
- Walls (in purple)
  - South wall more complex
  - Design complete
  - North wall design underway
- Mezzanine (in lime green)
  - Closely coupled to walls
  - Part of Hydrogen system
  - Needs to be built together with walls
- Installation to be complete June/July



Infrastructure: false floor

- Need to decouple the RF project from the false floor.
  - Andy Moss (DL) has agreed to lead the RF work and produce a costed plan for the remaining RF project
    - There is <u>just</u> enough space layout of the RF components under the false floor
    - Based on a ‘worst case’ proposal for RF distribution from DL



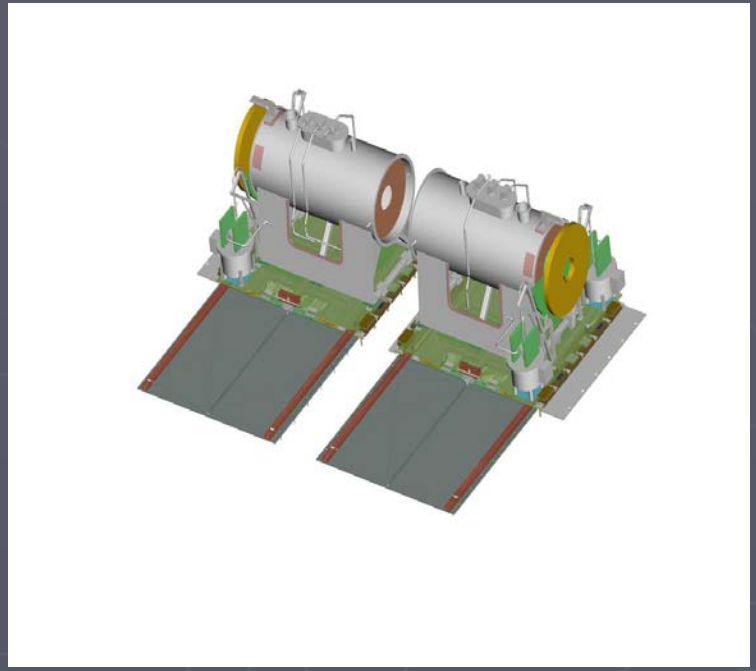


MICE Diffuser (Oxford)

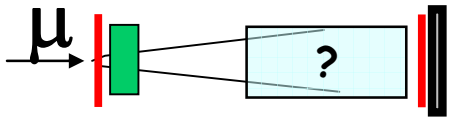
Parts cutting goes on (~60% completed)
Stand is designed

Rolling Platforms

- Largest (1&7) for the trackers
  - In production
  - Use air skates to facilitate movement
- Remainder:
  - Design #2,3,4,5,6, ready 12th April
  - Not required until Step III and later
- Considering modest re-designed to save cost with only a small loss of functionality
  - Delivery of #2,3,4,5,6 currently scheduled for 11th July

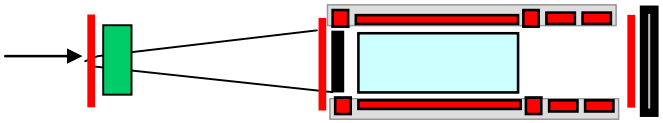


MICE steps



STEP I

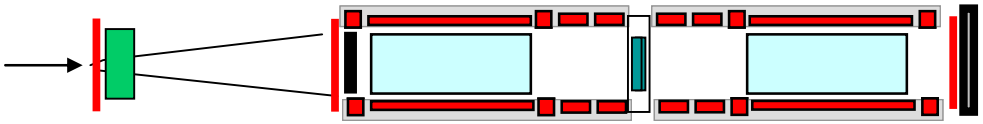
Febuary-May 2008



STEP II

UK PHASE I

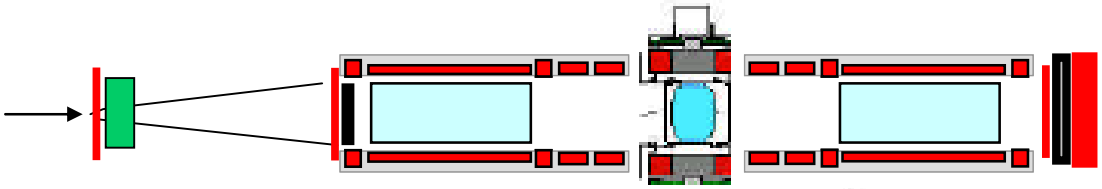
June 2008



STEP III/III.1

August/
December 2008

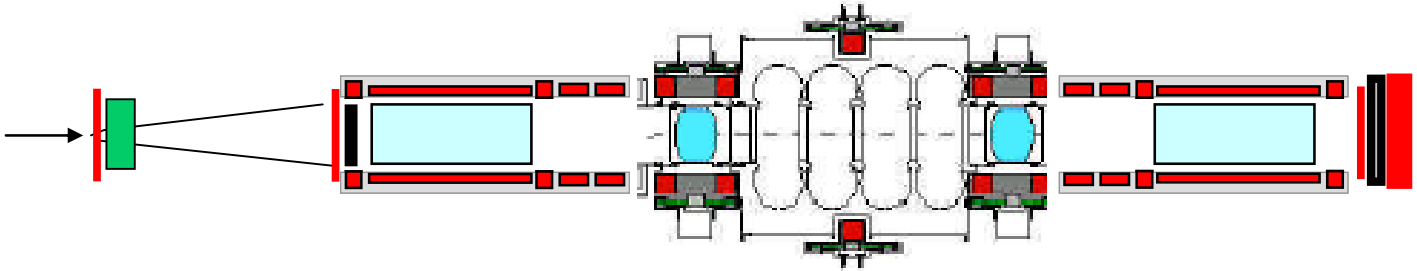
UK PHASE II



STEP IV

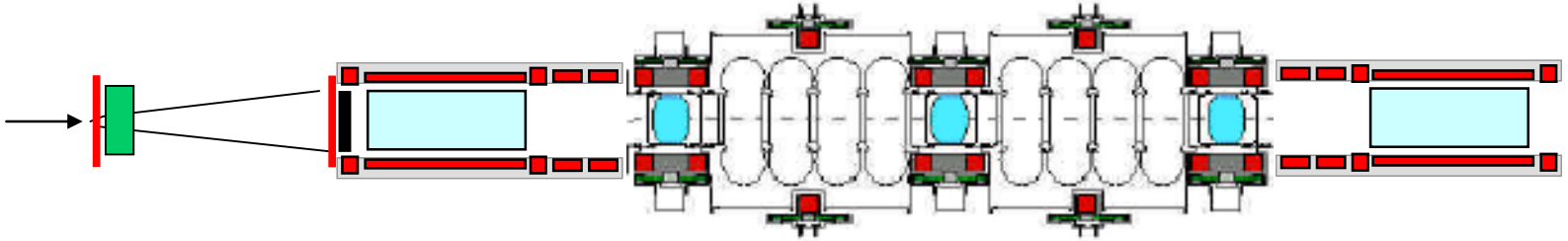
Delivery of 1st FC

--> september 2009!



STEP V

Q4 2010

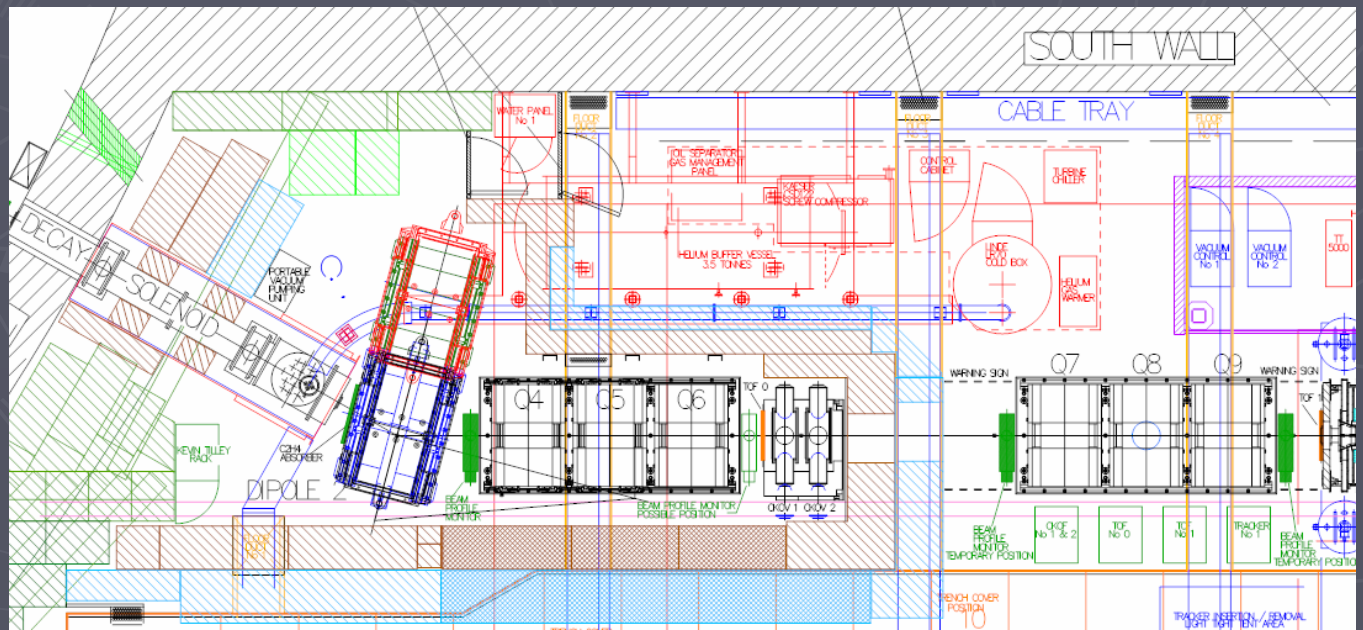


STEP VI

2011?

Step I

- Beam to end of DSA from end of present shutdown (27Mar08):
  - Instrumentation:
    - Beam monitors, beam counters, CKov, ToF0
- Beam to end of beam line (April – May):
  - Additional instrumentation:
    - ToF1 and KL



Phase II (comment)

- Phase II requires:
  - Three absorber/focus-coil modules
  - Two RF/coupling coil modules
    - See D.Li's talk
  - Infrastructure:
    - Hydrogen delivery
    - RF power
- Positive indications on focus-coil procurement (UK responsibility)
- Planning of implementation of Phase II infrastructure has started

Conclusions:

- MICE is inching its way to first data
  - Beam line essentially in place, but:
    - Many problems:
      - Water services
      - Interlock issues
      - PPS
    - Problems are being solved
- MICE Operations Managers in place and making a big difference
- Planning for Phase I data taking and Phase II construction advanced and advancing
- Looking forward to emittance measurements this year