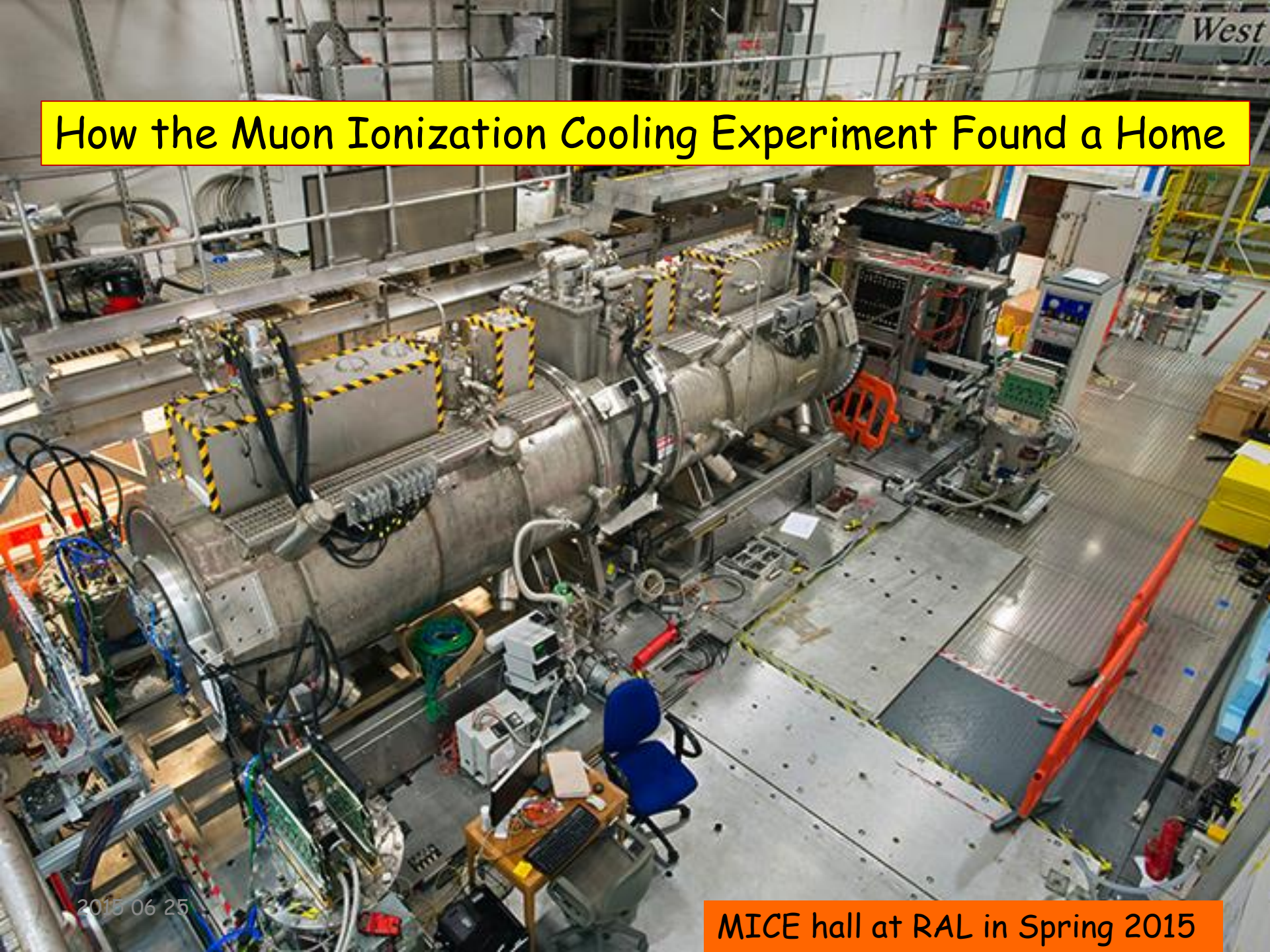
How the Muon Ionization Cooling Experiment Found a Home



2015 06 25

MICE hall at RAL in Spring 2015

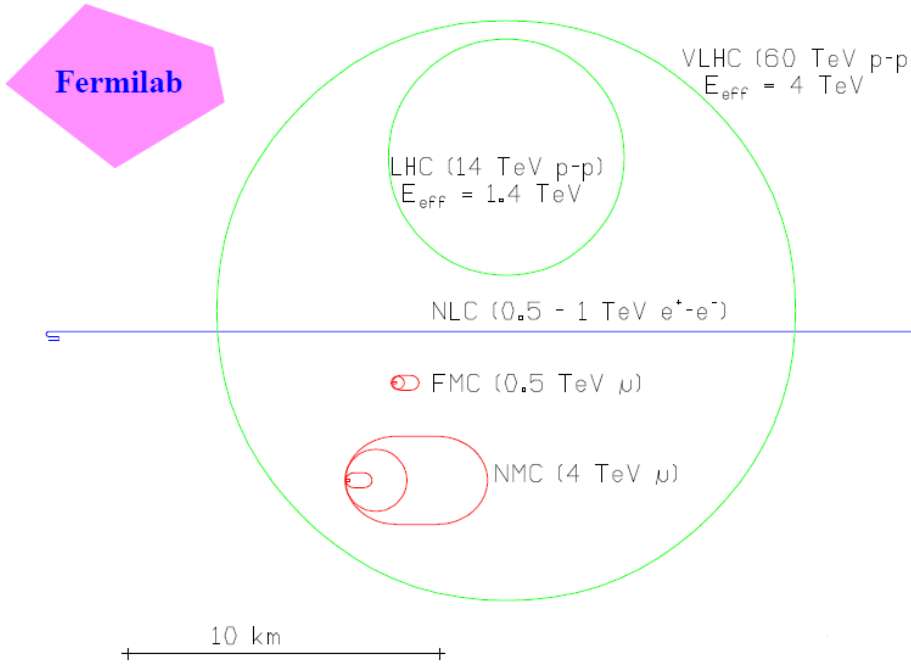
The Muon collider and neutrino Factory history dates back from the 1960's
It was not until ionization cooling was proposed by Budker and Skrinsky (70,71)that it became possible to think of muon colliders.
D. Neuffer, B. Palmer et al developped the concept in the 1990's but it became evident that ionization cooling was a delicate optical and engeneering concept and needed to be demonstrated.

There was a very successful workshop at Fermilab in 1997 where the concept of neutrino factory was born and the MUCOOL experiment was proposed to Fermilab in 1998 (S. Geer, spokesperson). **Compactness and stageability**!

Proposal
Ionization Cooling R&D Program for a High Luminosity Muon Collider

Muon Collider Motivation 3

- Within the high energy physics community there is currently a lot of interest in understanding the feasibility of building a high luminosity high energy muon collider.
- This interest is well motivated:
  - Path to Multi–TeV lepton colliders
  - Small beam energy spread ($\Delta p/p \sim 0.003$ %)
  - Possible s–channel Higgs boson factory
  - Front–End Physics ... added bonus
  - Stagable and Compact



The R&D program was funded but the experiment itself was considered premature

CERN and ECFA became interested and requested a «prospective design study»

A. A THREE-STEP SCENARIO

CERN 99–02
ECFA 99–197
30 April 1999

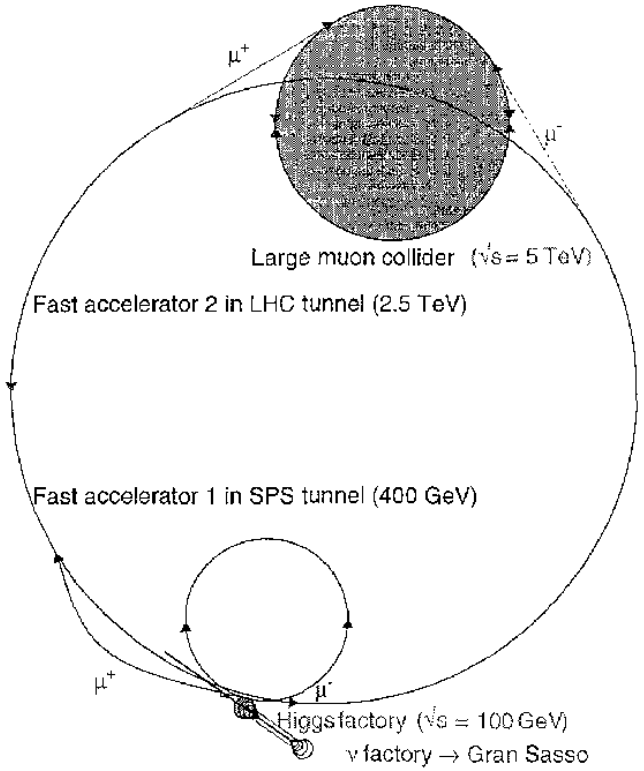


Fig. 1: Possible layout of a muon complex on the CERN site.

From which emerged the series of NUFACT worskshops in collaboration with the US and Japan

MICE is an international effort from the start.

NUFACT00	Re-activated the recognized need for muon cooling expt
2000-2001	Workshops on Muon Cooling Experiment (CERN, Chicago, London)
NUFACT01 7:30 am	Breakfast in Tsukuba: Steering group formed →
Sept. 2001	Workshop at CERN where final experiment took shape.
November 2001	Letter of Intent (LOI) submitted to PSI and RAL
January 2002	PSI cannot host experiment, will collaborate (beam solenoid)
June 2002	RAL IPRP Review Panel encouraged submission of proposal >
January 2003	Proposal submitted
July 2003	Recommendation by International Peer Review Panel
October 2003	'Scientific approval' by RAL CEO John Wood
	Project Manager appointed (P. Drumm, RAL)
	RAL CM: collaboration charter approved
December 2003	Gateway 1 review
June 2004	Gateway 1 passed on 'amber'
20 December 2004	Gateway 2/3 passed: 10 green + 4 amber (MICE PHASE I)
March 2005	Release of UK funding being approved by PPARC and CCLRC 9.7 M£

MICE IS A TEENAGER

No breakfast photo,
but
Ken Peach at NUFACT01

with Dave Wark
and Helmut and Mme Haseroth

Collaboration meeting at RAL in 2002

MICE FOUND A HOME !

Recall: John Wood to Alain Blondel, 24 Oct 2003

24-October-2003

Dear Alain,

The last few months have seen the international MICE project proposal peer reviewed at both a national and an international level. The scientific case, technical merits and timeliness of the proposal have been strongly endorsed in each case. CCLRC accepts the strong endorsement of the proposal by the Astbury panel and consequently considers the proposal to have full scientific approval.

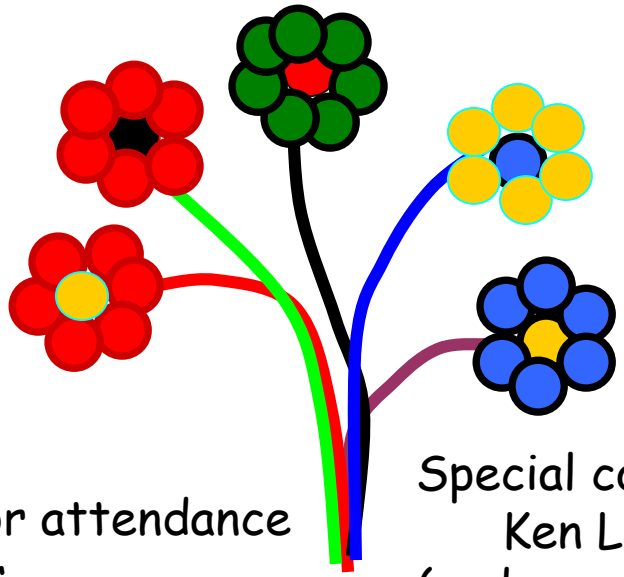
Progress of the project is now dependent on satisfactory funding arrangements being in place together with an appropriate project management structure. These arrangements will require scrutiny to ensure "best value" for UK and other investors. Within the UK this will be ensured by an independent review through the "Gateway" process that will be managed by the Joint MICE Project Board.

CCLRC therefore approves the project subject to a satisfactory progress through Gateway. The MICE proponents are now encouraged to actively seek funds to support MICE.

Yours sincerely

Professor J V Wood
Chief Executive

MERCI!



All MICE members for attendance
great presentations,
hard and intelligent work

Special congratulations to UK colleagues
Ken Long et al
(and our godfather K.Peach!)
for getting experiment through gateways

Paul Drumm and technical team
for fantastic organization&foresight
that will get us to goal <u>safely</u>

AB, 2005

Signatures of MOU for decay solenoid

Ralph Eichler (PSI director)

Paul Drumm (MICE PM)
and John Wood (RAL CEO)

The solenoid at RAL in 2006

First dipole installation in beam line in 2007

Ken Long addressing a «MICE Briefing»

A final note

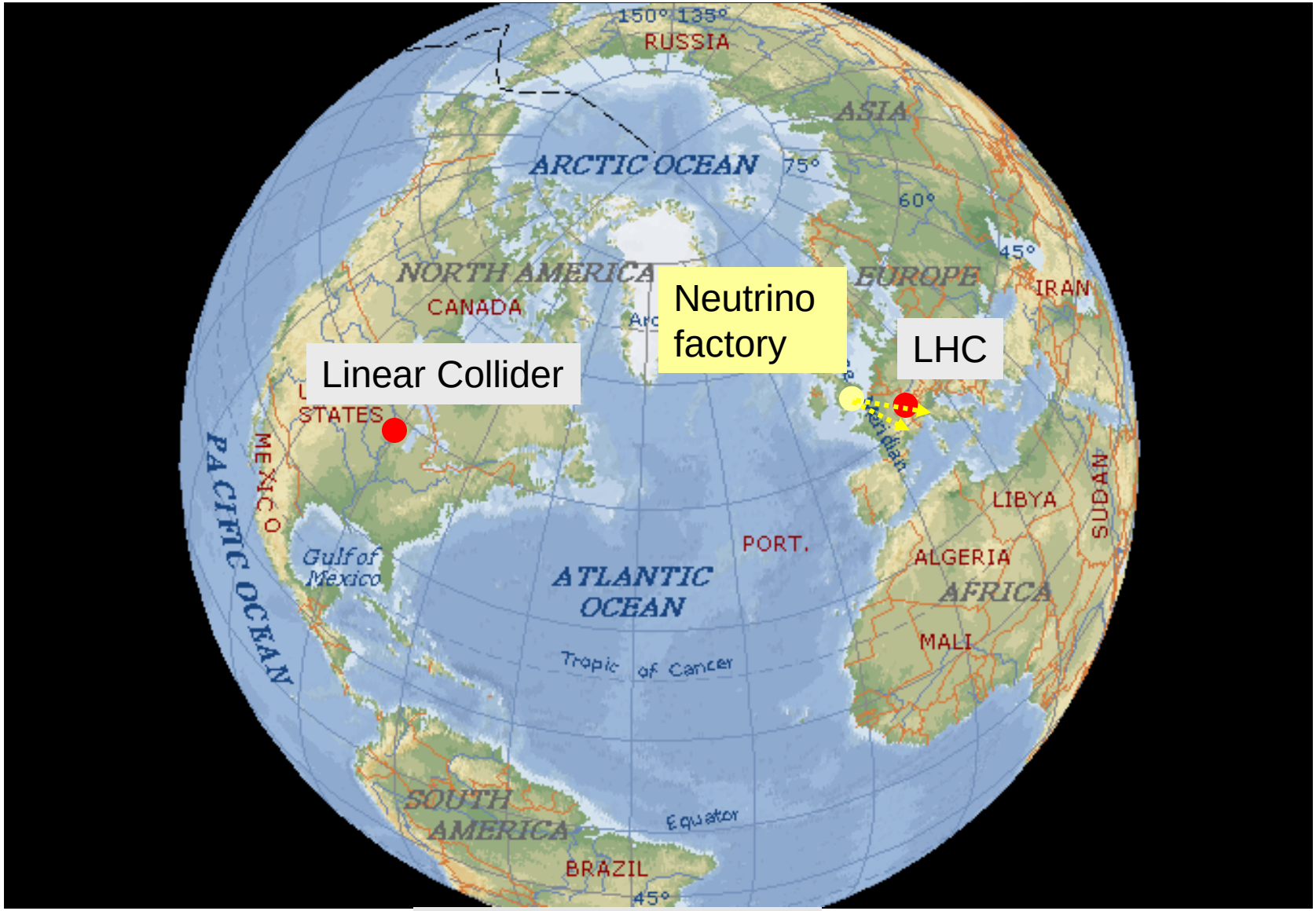
First particles in the MICE beamline were seen in spring 2008, and the first MICE magnets finally arrived at RAL in 2013. The magnetic shielding is complete now and the magnets are cooling.

MICE, after much hard work and problem-solving is ready to make the first experimental measurements of muon-cooling properties of Hydrogen and LiH absorbers.

Support from RAL and STFC has been unwilting and deserves our profound gratitude

None of this could have happened without the vision of the RAL leaders and their deep conviction that RAL had a role to play in the long term future of muon storage rings. →

Why not?



John Womersley 2005