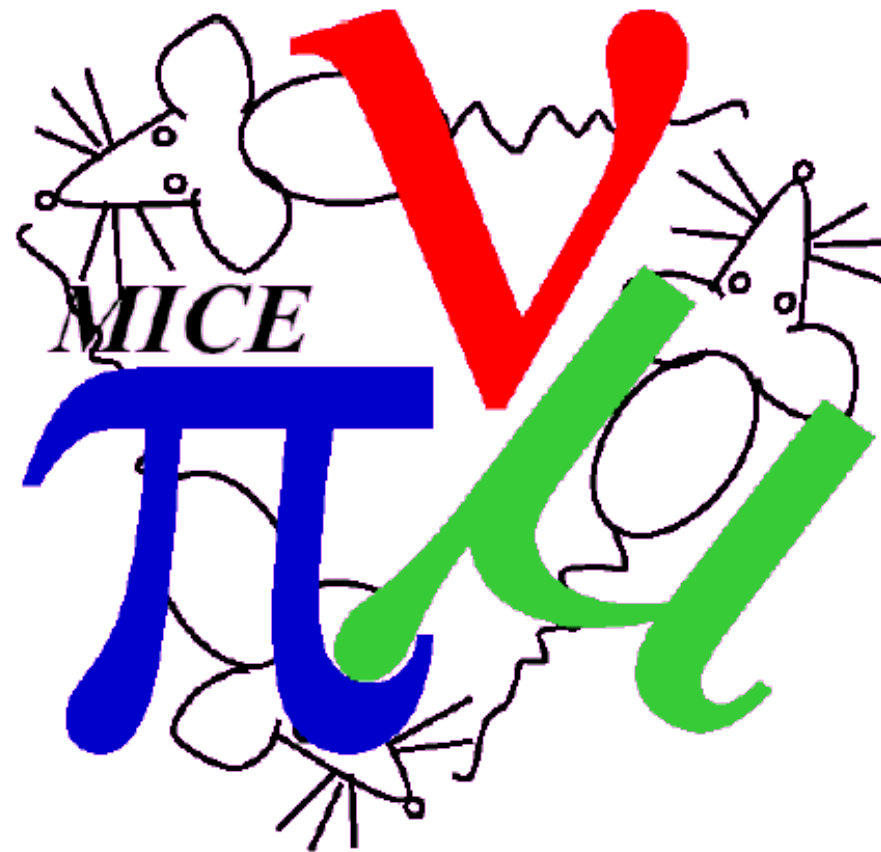


Consuntivo MICE 2011-2012

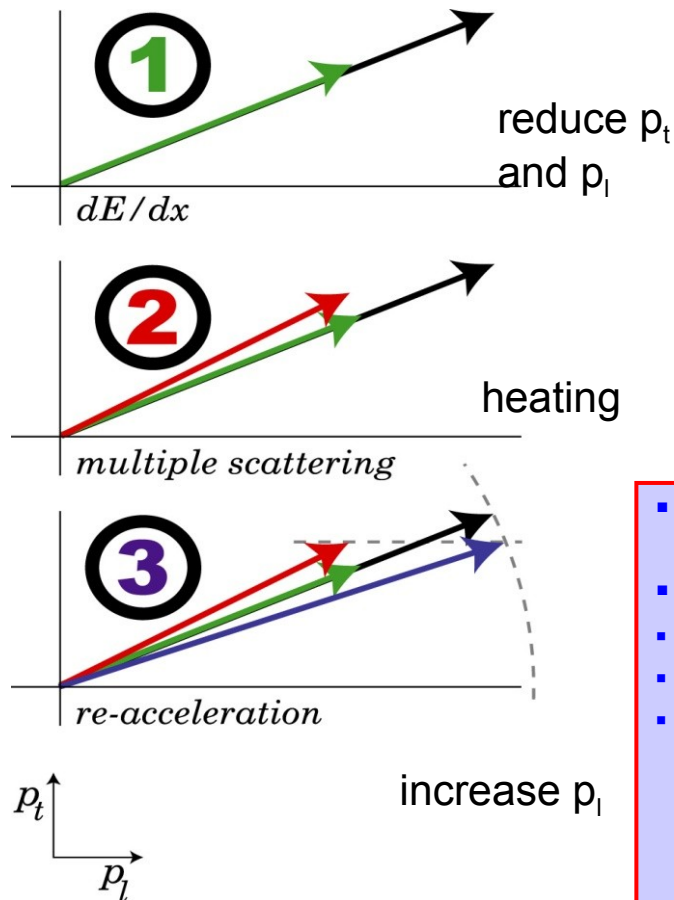


Muon ionization cooling

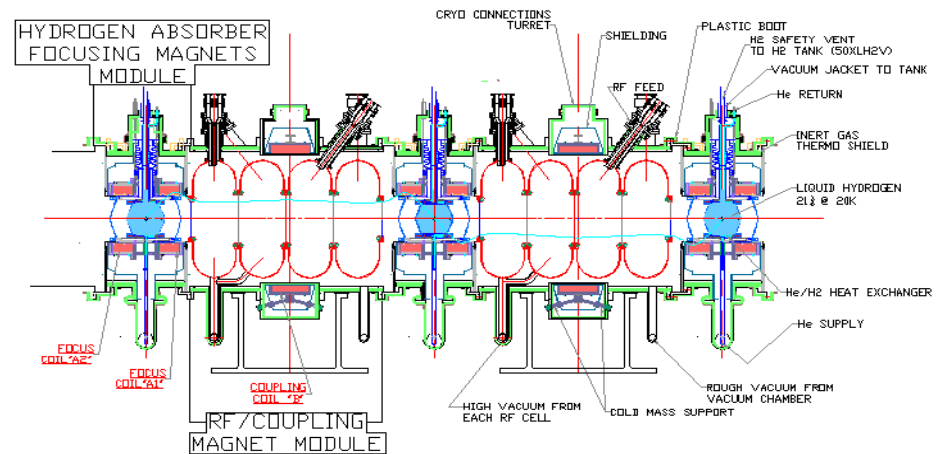
Stochastic cooling is too slow.

A novel method for μ^+ and μ^- is needed: **ionization cooling**

principle

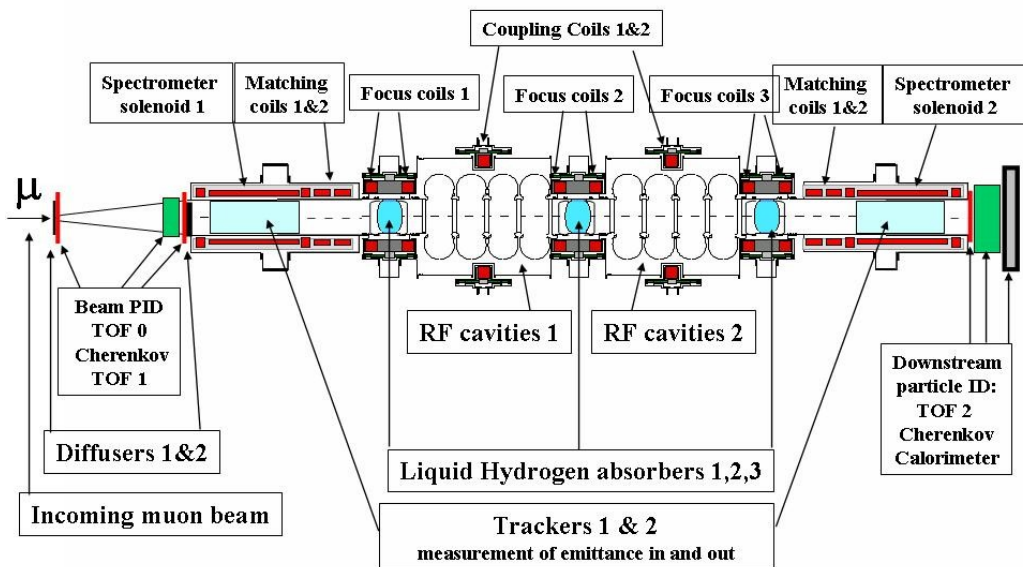


reality (simplified)



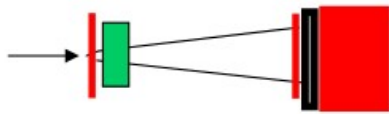
- Build a section of cooling channel long enough to provide measurable cooling (10%) and short enough to be affordable and flexible
- Wish to measure this change to 1%
- Requires measurement of emittance of beams into and out of cooling channel to 0.1% !
- Cannot be done with conventional beam monitoring device
- Instead perform a single particle experiment:
 - High precision measurement of each track ($x, y, z, p_x, p_y, p_z, t, E$)
 - Build up a virtual bunch offline
 - Analyse effect of cooling channel on many different bunches
 - Study cooling channels parameters over a range of initial beam momenta and emittances

MICE schematic

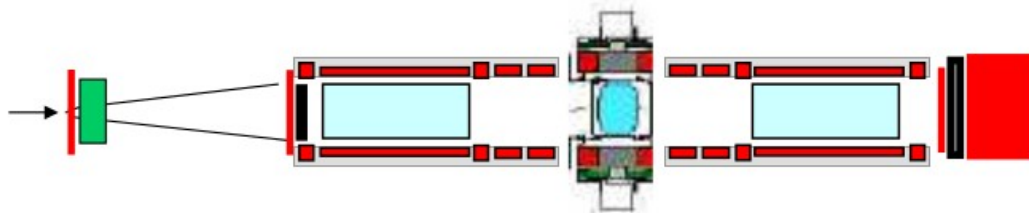


MICE schedule

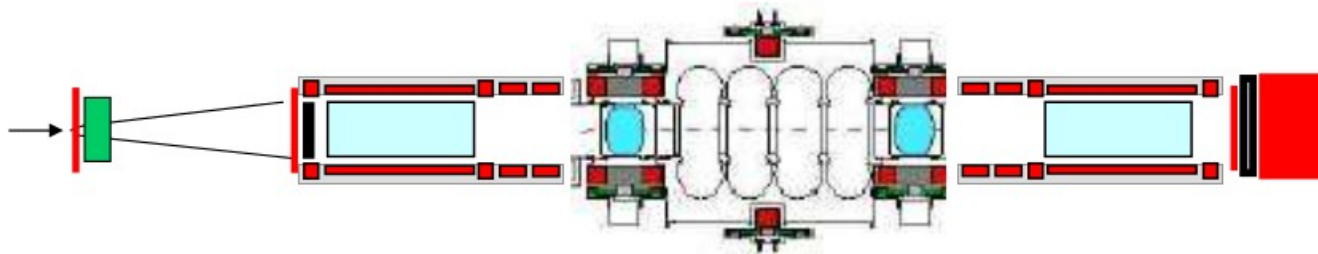
μ



STEP I

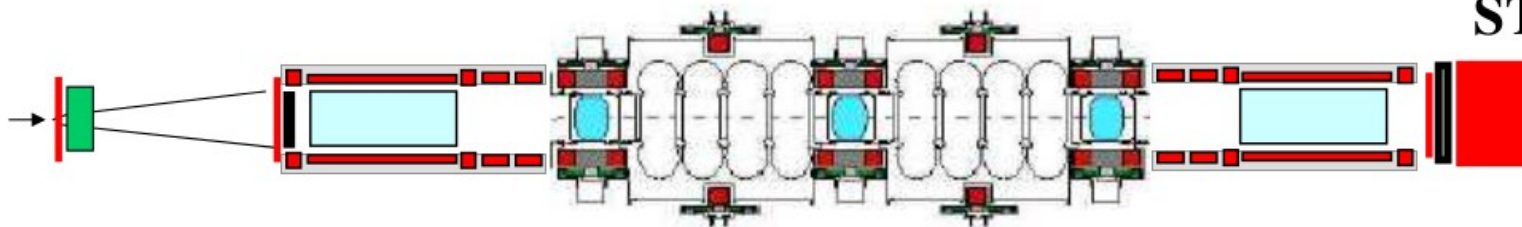


STEP IV Q3 2012



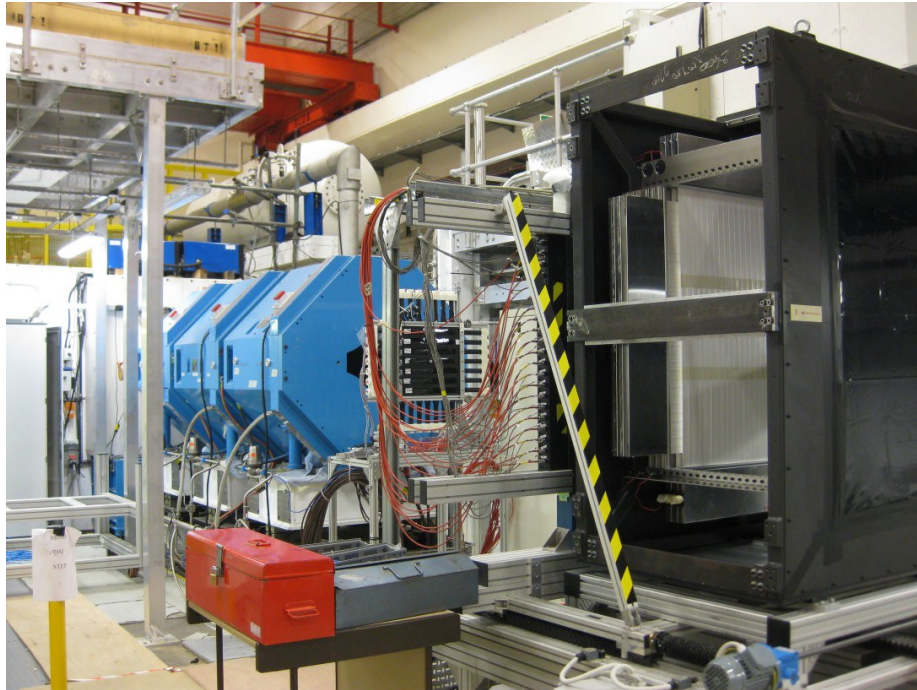
STEP V

*Q2 2014 *)*

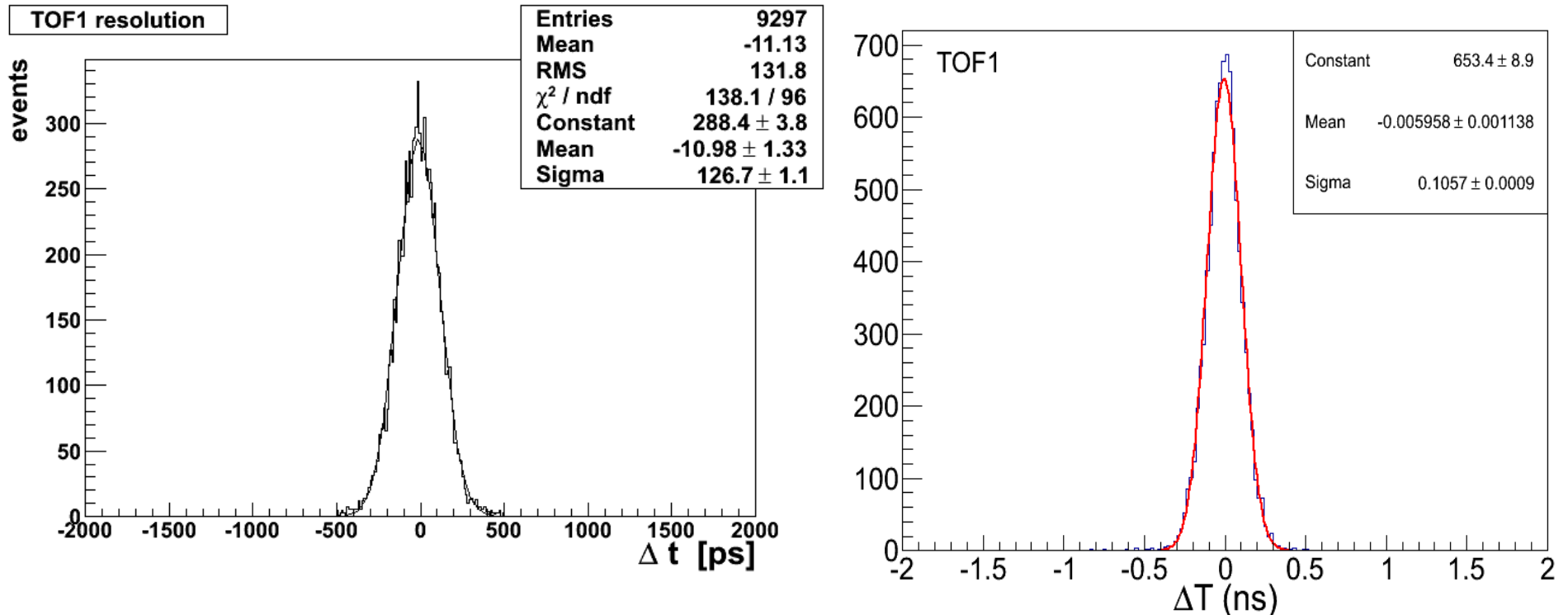


STEP VI

Situazione attuale della MICE Hall



TOF calibrations results

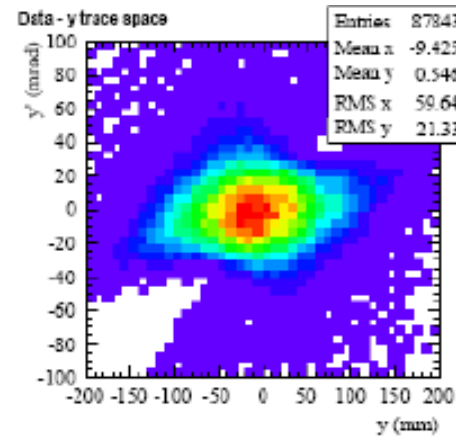
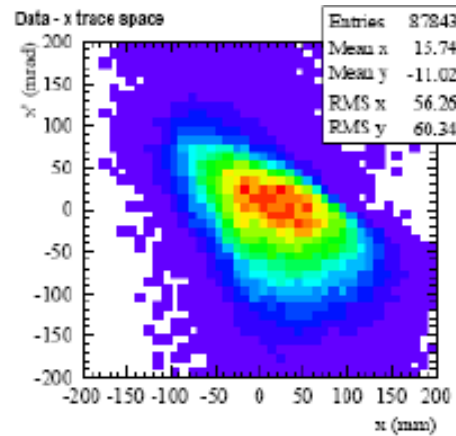
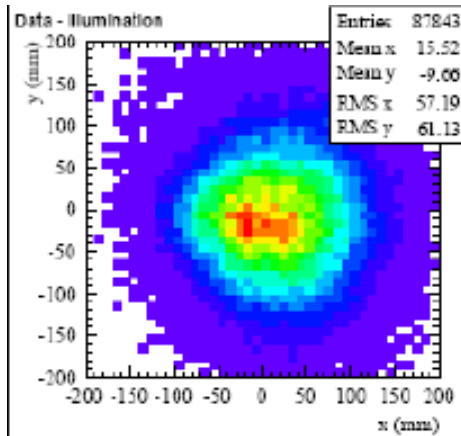


Nella prima calibrazione la risoluzione del TOF1 era di circa 60 ps.
In seguito sono stati sostituiti il 50% dei PMT di TOF0 e il 100% di quelli di TOF1.
Dopo il refurbishing la risoluzione di TOF1 è passata a 50 ps.

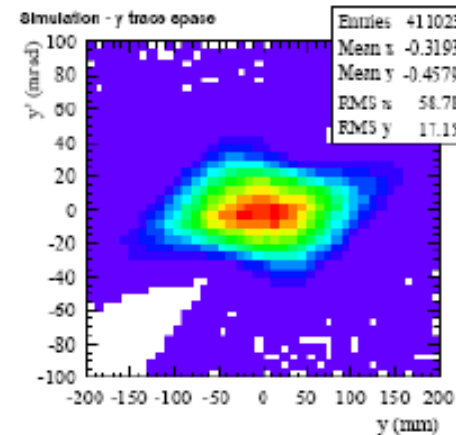
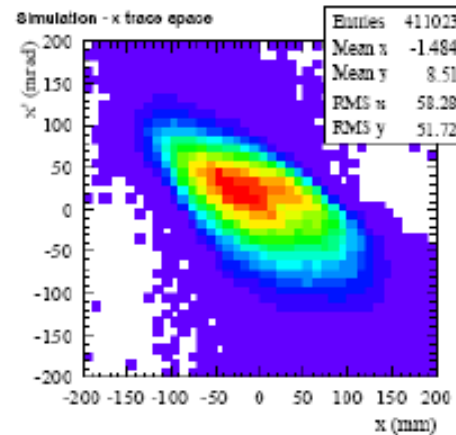
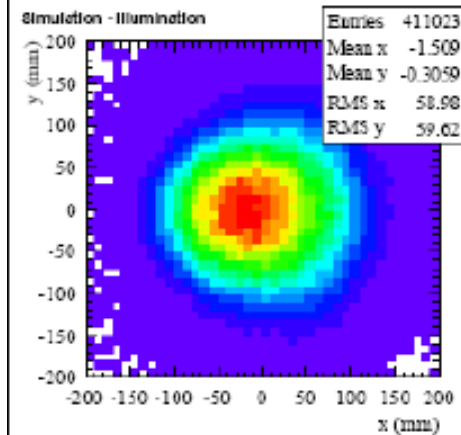
Emittance measurements with TOF

Reconstructed transverse phase space of the baseline MICE beam at TOF1

Data



MC

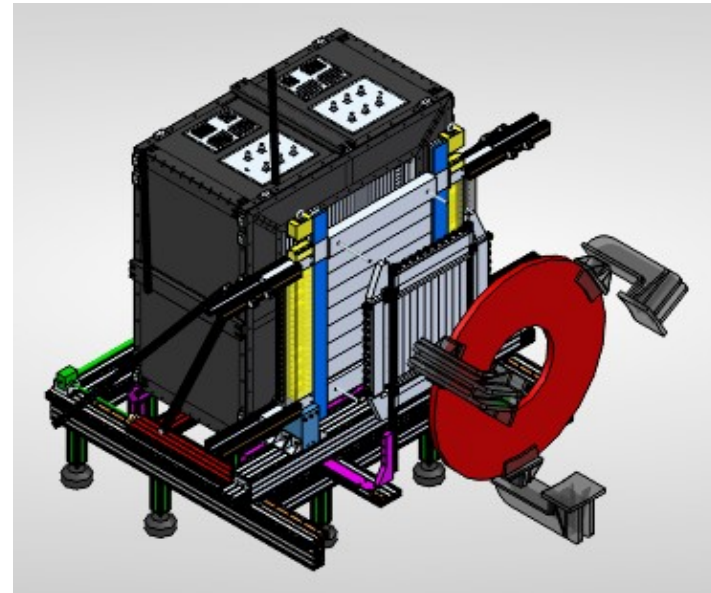
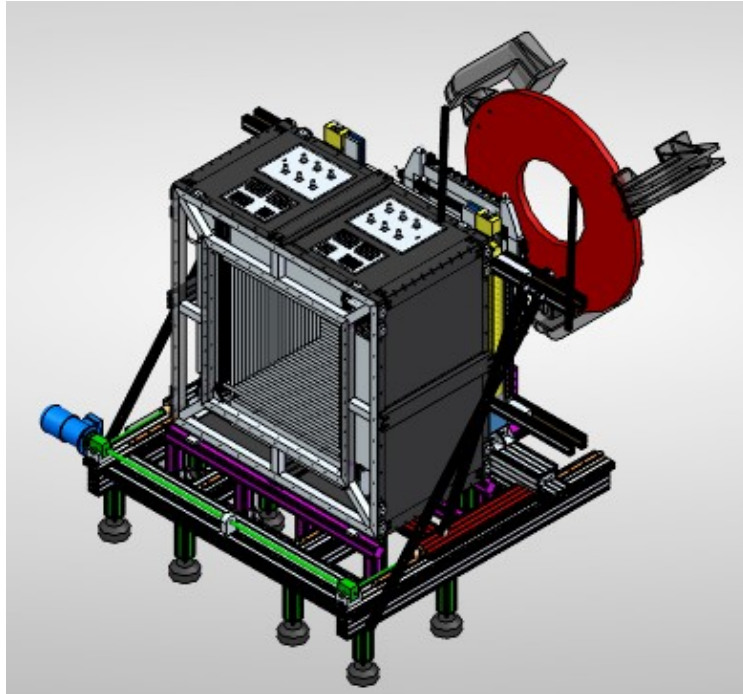


y(mm) vs x(mm)

x' (mrad) vs x (mm)

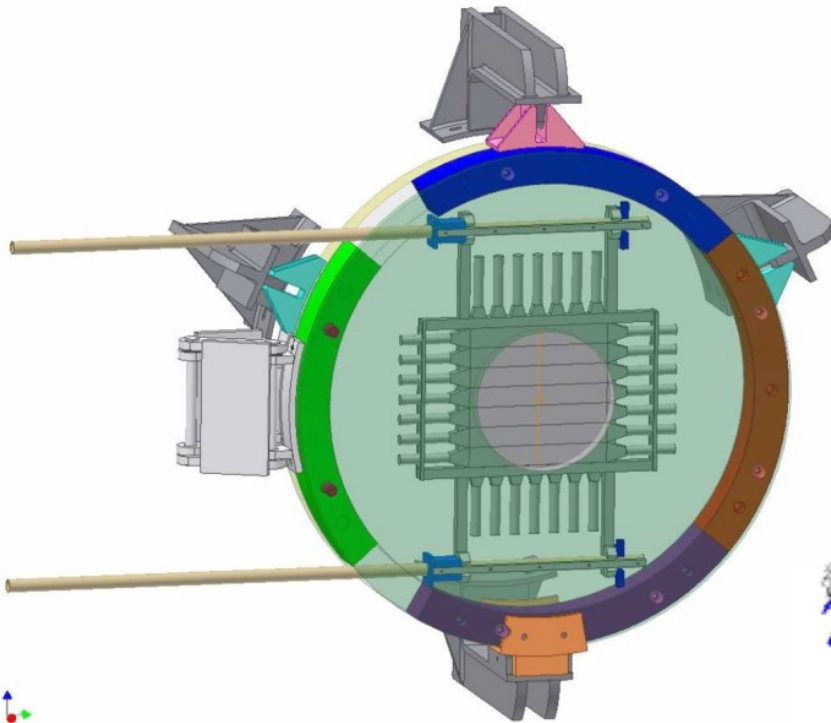
y'(mrad) vs y (mm)

MICE engineering integration

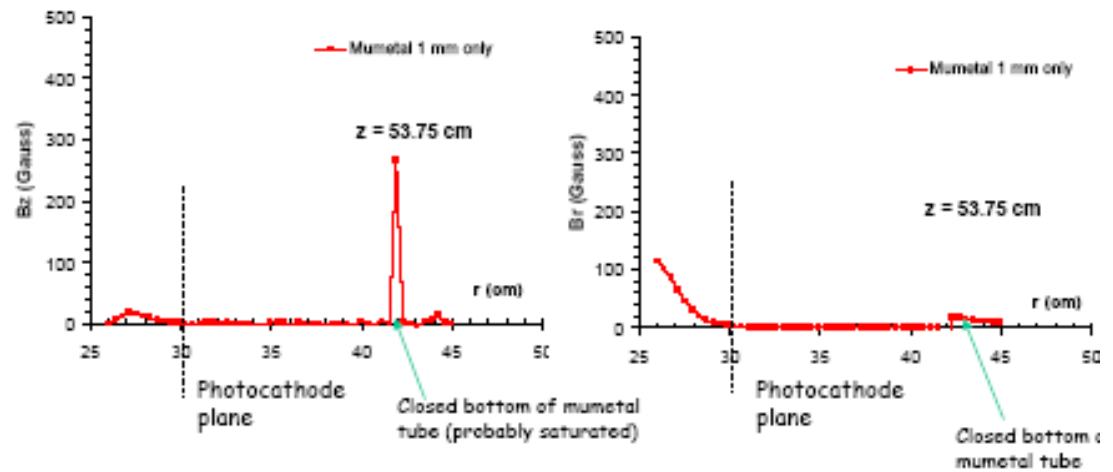


Integration on downstream PID (a lot of contacts with UniGE people + RAL people)

TOF1 shielding



TOF1 field components along PMT axis - UCL



Central hole diameter = 420 mm
1-mm mumetal only

2D computation!

Articoli, note e poster pubblicati

1. R. Bertoni, M. Bogomilov, M. Bonesini, A. de Bari, G. Cecchet, Y. Kharadzov, D. Orestano, F. Pastore, L. Tortora, R. Tsenov, “Analysis of PID detectors (TOF and KL) performances in the MICE 2010 run”, MICE-NOTE-DET-0337, 2011.
2. R. Bertoni, M. Bonesini, A. de Bari, G. Cecchet “The Refurbishing of MICE TOF0 and TOF1 detectors”, MICE-NOTE-DET-0363, 2012.
3. M Bogomilov *et al* “The MICE Muon Beam on ISIS and the beam-line instrumentation of the Muon Ionization Cooling Experiment” 2012 JINST 7 P05009 doi:10.1088/1748-0221/7/05/P05009.
4. Presentazione a Neutrino Town Meeting, CERN, e 12th Pisa Meeting on Advanced Detectors, La Biodola.

Attività' per il 2013

- **Nel 2013 dovrebbero arrivare finalmente i solenoidi SC sviluppati a LBL e si pensa di saltare direttamente allo STEP IV per riguadagnare il tempo perso. Questo puo' comportare un grosso sforzo di reinstallazione al RAL ed impegno tecnico/i + servizi.**
- **Installazione al RAL del sistema di calibrazione a laser veloce**
- **Posizionamento TOF1 e TOF2 per lo STEP IV dell' esperimento (schermaggi magnetici)**
- **Sviluppo di un prototipo di sistema TOF basato su array SiPMT della SenSL al posto dei convenzionali PMT R4998 Hamamatsu.**