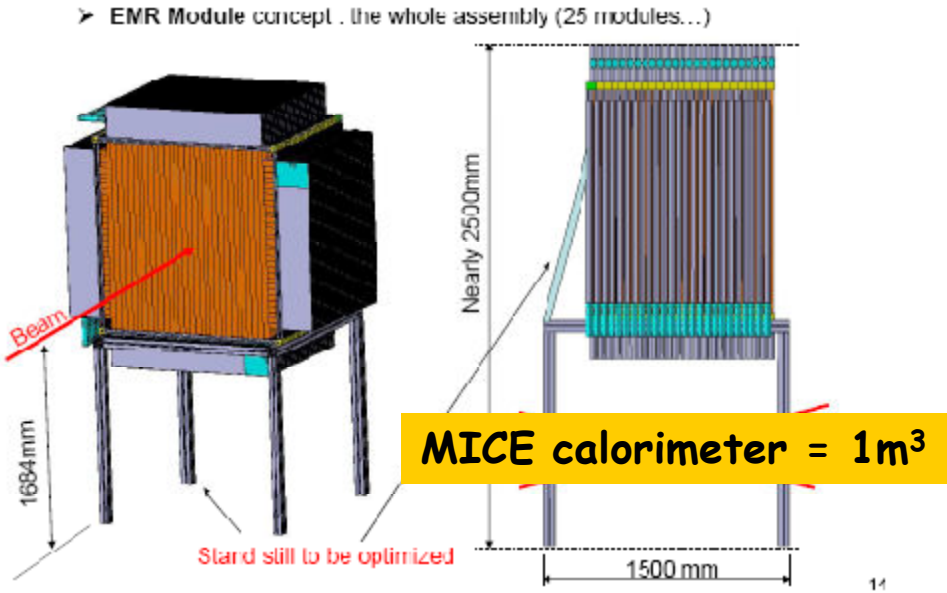
Fast detectors for magnetized near detectors in Superbeam, beta-beam, neutrino factory

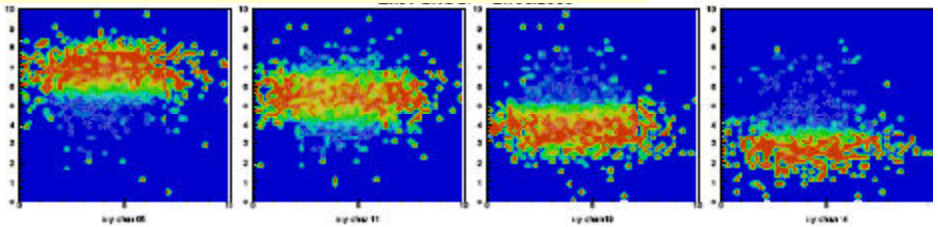
Triangular shaped bars (1.1m long, from Fermilab)

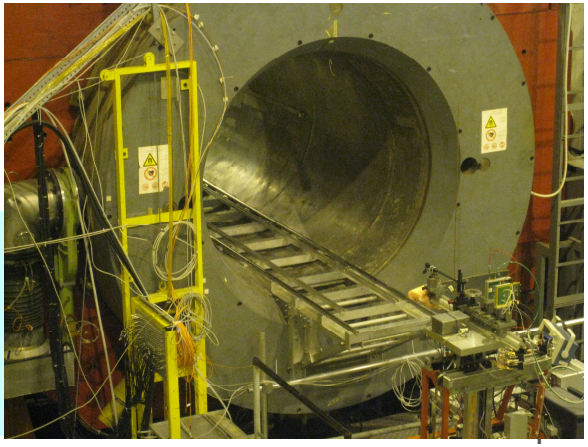


MICE calorimeter = 1m^3

Accurate position resolution (mm)
→ triangular shaped scintillator bars
Magnetic field → si-PMT readout

First test in T9 beam last week:





Next step: test at CERN in Dipole magnet in H8) →
Variable density by spacing planes
-- reconstruction of showering electrons
-- stopping properties of pions and muons

Materials
For 48 planes of 64 scintillator about 1m long bars
-- scintillator: assume Fermilab can provide as for EMR
-- SiPM and electronics in a first iteration can use spaers
from the T2K EMCAL
(contacts D. Wark, C. Touramanis)
-- ibid for electronics with 48 front-end and 2 back end boards.
-- not fast electronics (not suited for MICE beam, OK for CERN beam)

Construction in independent planes mounted on a extendable frame,
allowing density from 1 to ~0.4 (air gaps)

Aims:
-- expose to 250 MeV/c to 10 GeV/c particles (e, pi, mu)
Charge ID for electrons, stopping ID for charged mu and pi and protons.
Interactions of pions
Shower energy and angle?
-- contact at CERN with Ilias Efthymiopoulos (NEU2012) for beam line.
To be checked: incoming particle ID. (TOF, CKOV)

For stopping particles could prefer MICE beam.

Following steps:
-- use same or similar planes as detector for MIND situated outside magnet
-- develop cheap electronics to envisage mass prodiction
-- develop >15 m long scintillator bars

Requests from this group:
-- software for test beam simulation and analysis
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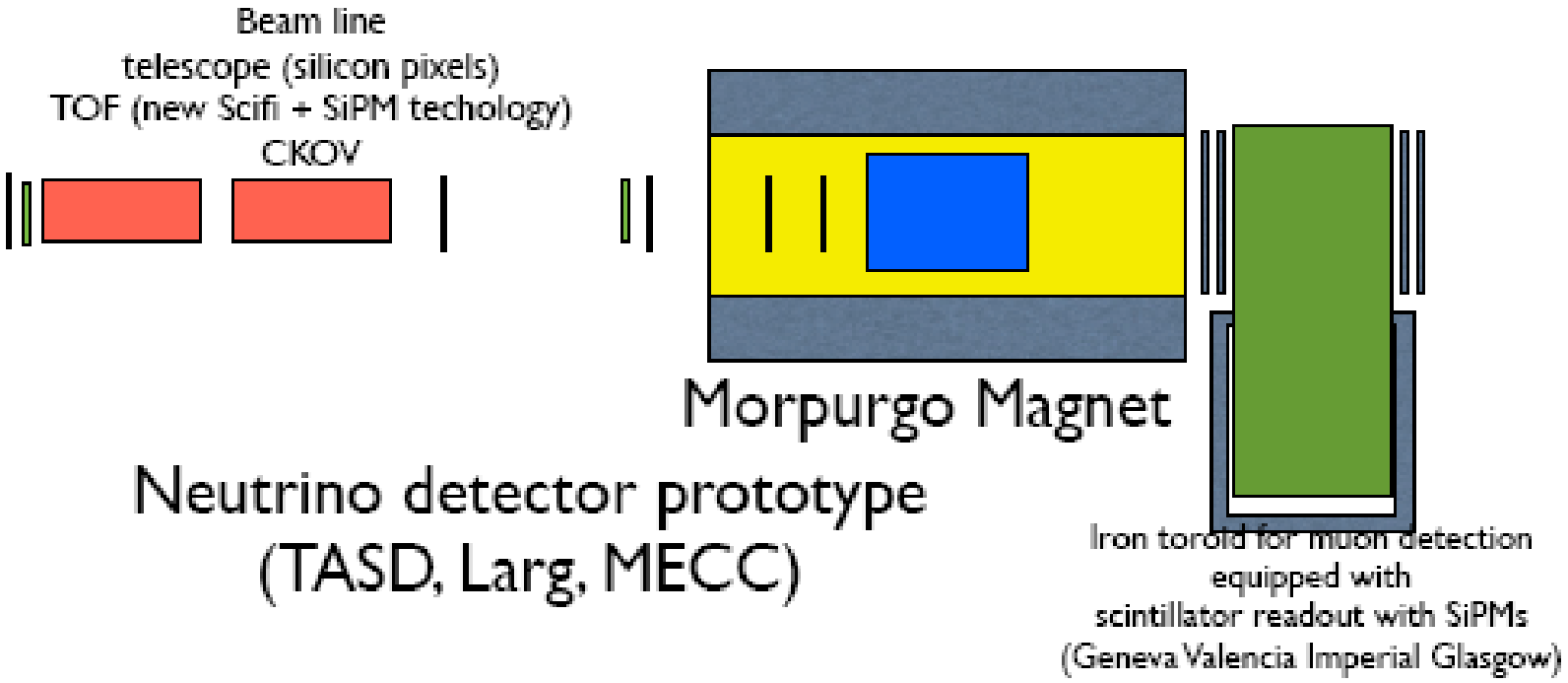
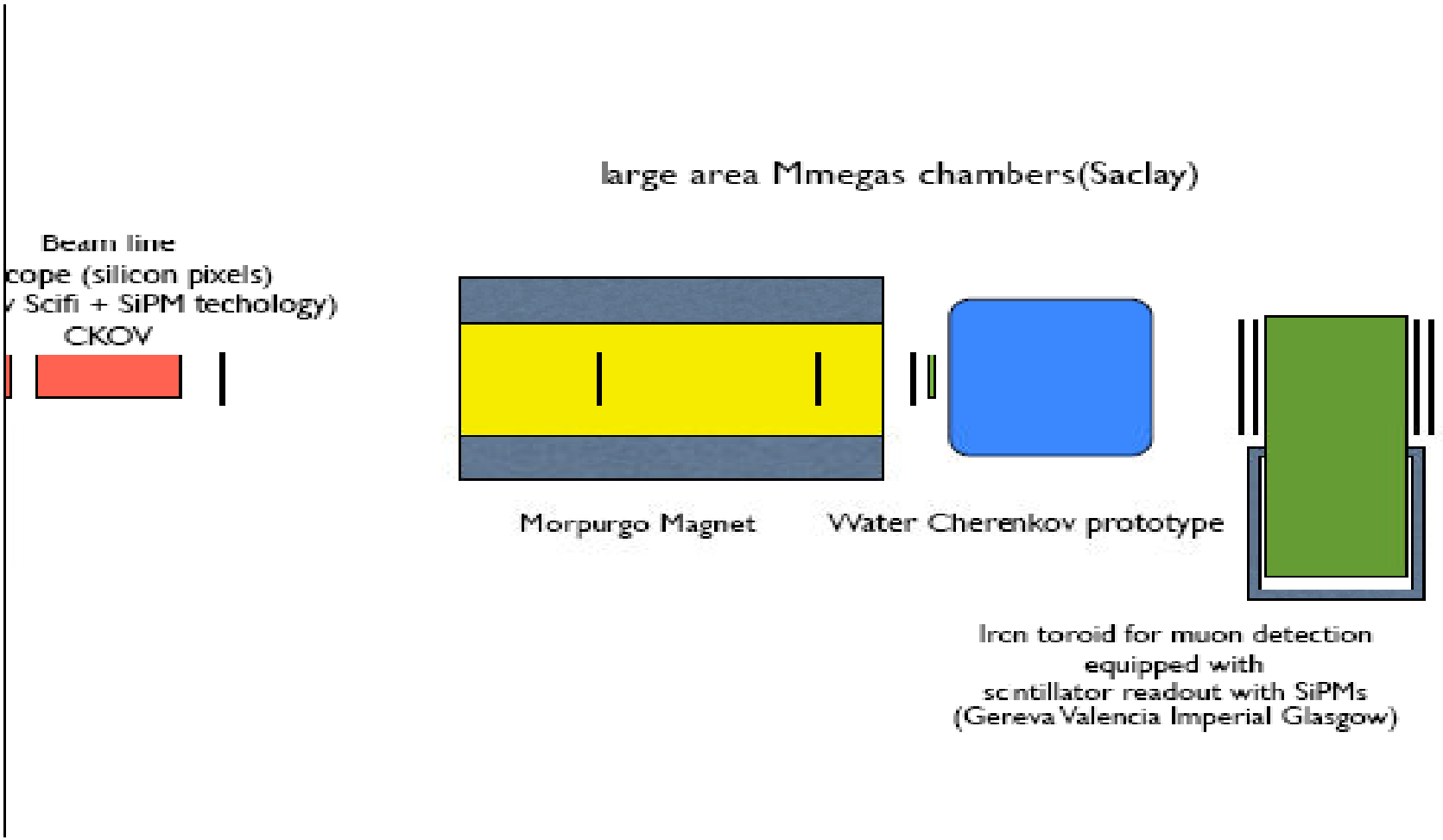
large area Mmegas chambers(Saclay)




large area Mmegas chambers(Saclay)
Beam line
cope (silicon pixels)
Scifi + SiPM techology)
CKOV
Morpurgo Magnet
Water Cherenkov prototype
Incn toroid for muon detection
equipped with
scintillator readout with SiPMs
(Gereva Valencia Imperial Glasgow)