

T2K: первое событие в дальнем детекторе и ближайшие планы

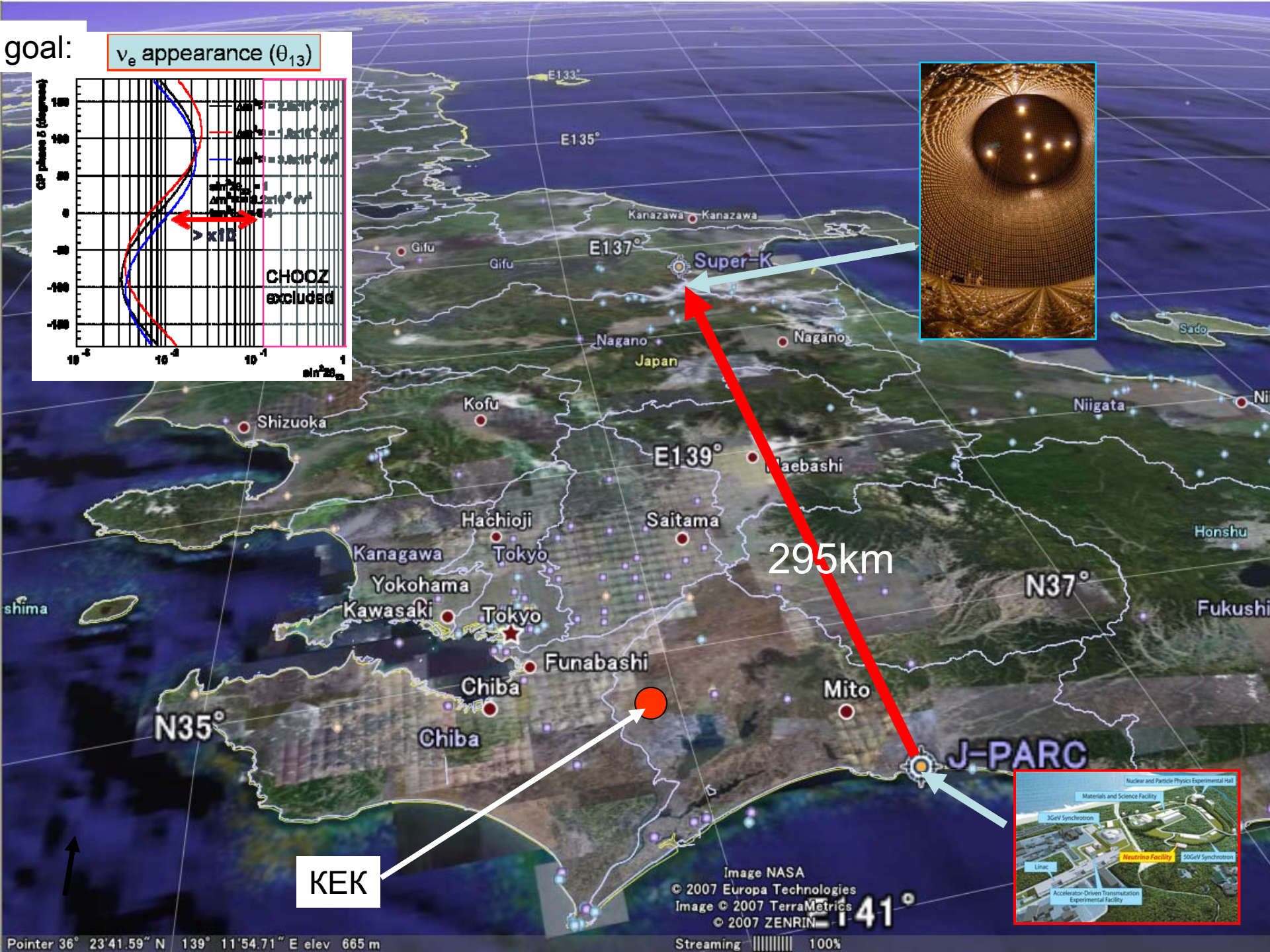
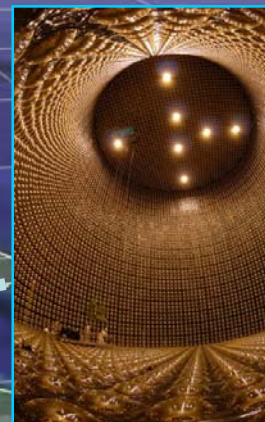
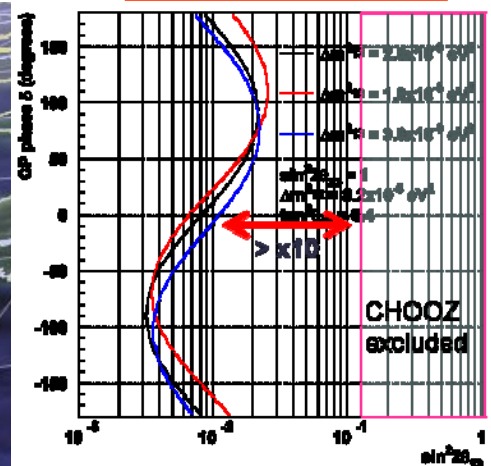
Ю.Г. Куденко

Ученый совет ИЯИ РАН

12 марта 2010

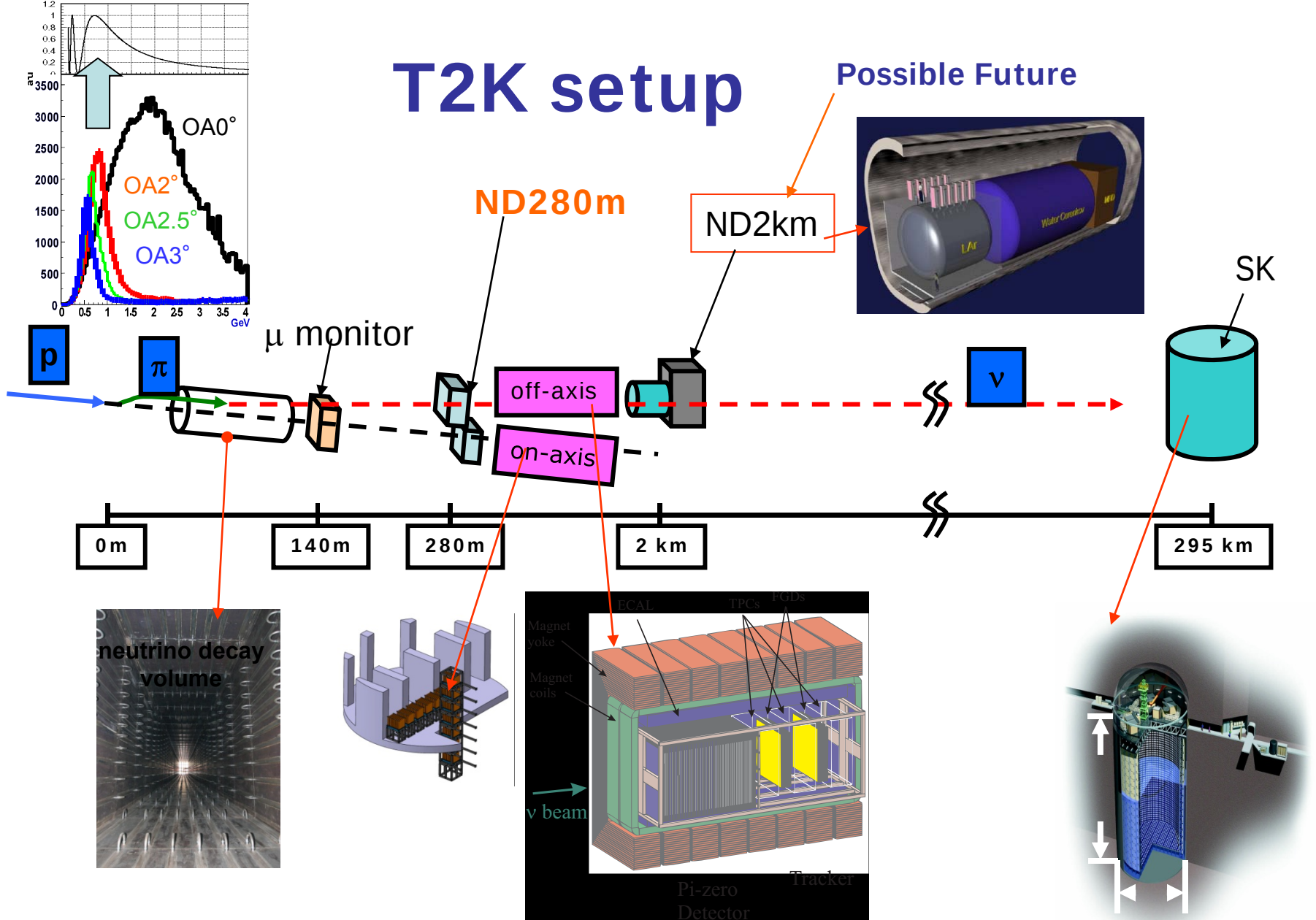
goal:

ν_e appearance (θ_{13})

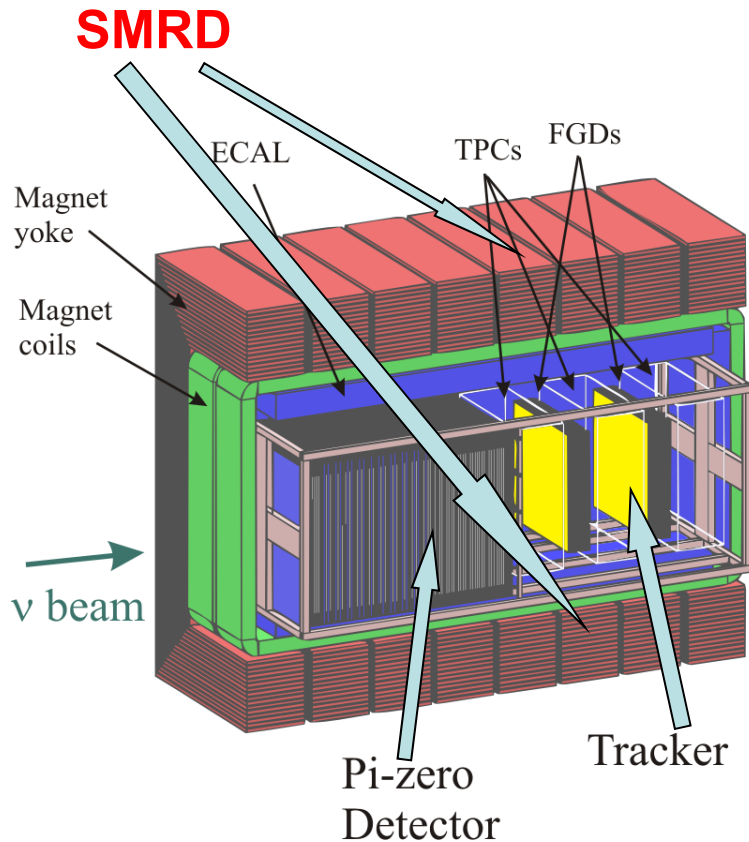


T2K setup

Possible Future



ND280 Off-axis Detector



**280m downstream from
pion production target**

UA1/NOMAD CERN magnet

operated at 0.2 T magnetic field

Tracker: Optimized for CC interactions measurements

- Fine Grained Detector (FGD)

- measure ν beam flux, E_ν spectrum, flavor composition through CC ν -interactions,
- backgrounds CC- 1π
- water and scintillator target

- Time Projection Chamber (TPC)

- measure charged particle momenta, particle ID via dE/dx
- measure backgrounds/pion cross section

Pi-Zero Detector (P0D)

- Optimized for NC π^0 measurement
- measure ν_e contamination

Electromagnetic Calorimeter (ECAL)

- Photon detection (from π^0) in P0D and tracker
- charge particle ID and reconstruction

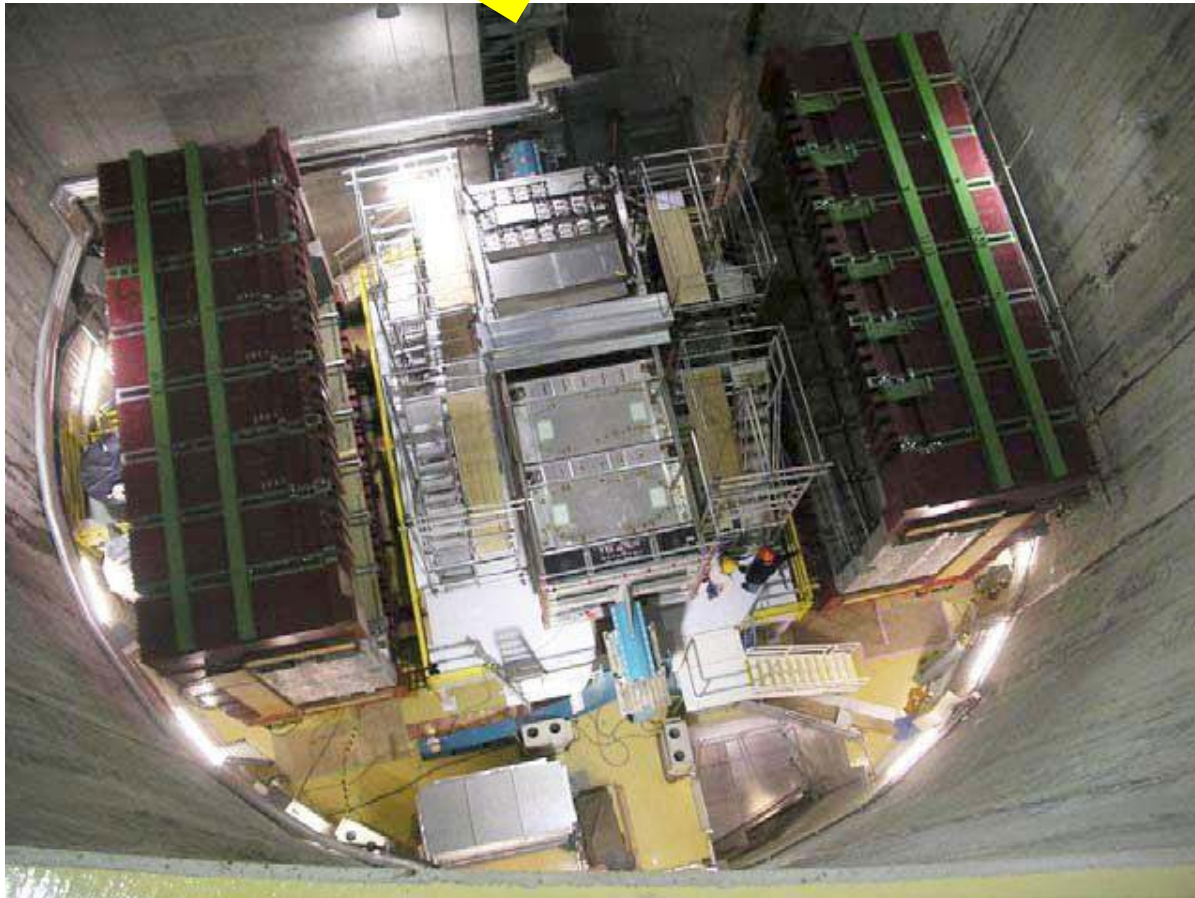
Side Muon Range Detector (SMRD)

- measure momentum for lateral muons
- cosmic rays trigger

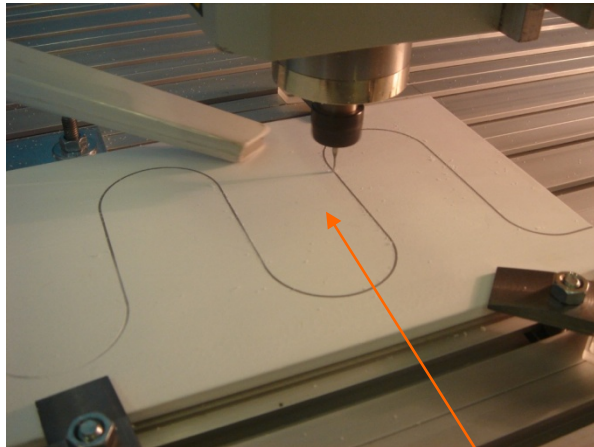
ND280

ν beam

open magnet



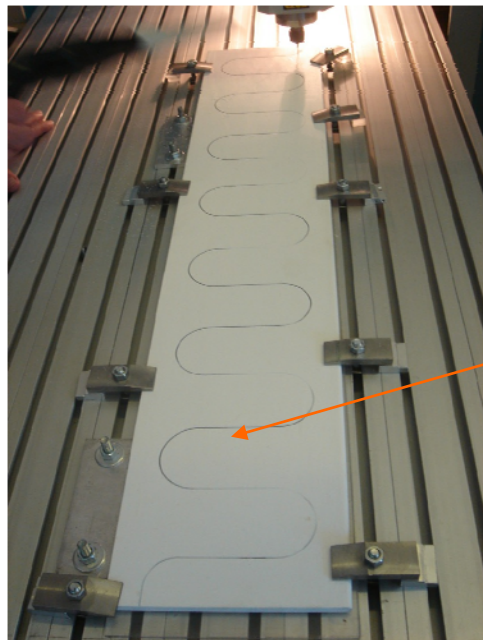
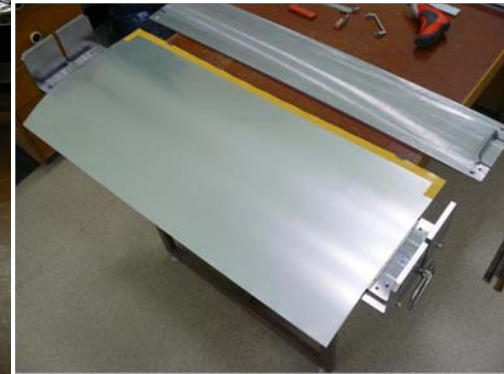
SMRD detectors



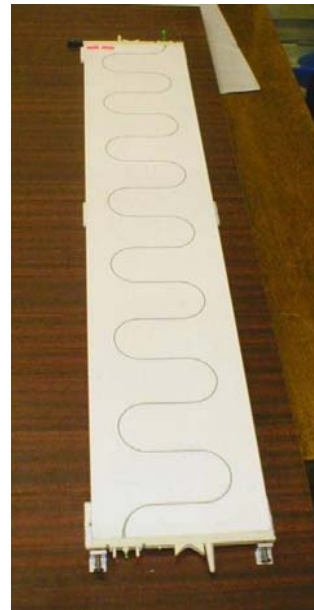
Y11 fibers
embedded and
glued



stainless steel
container



Preparation
of S-grooves



Ready for shipment

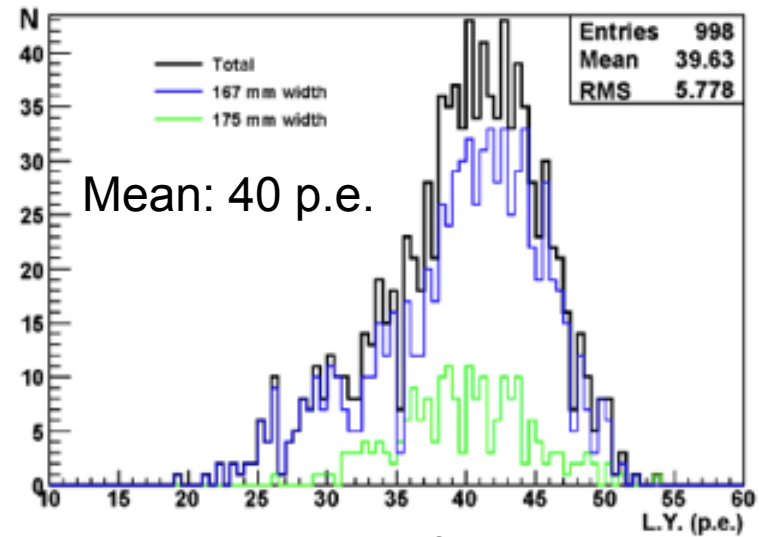


**All 2130 SMRD detectors
are manufactured at INR**



Shipped to JPARC on 23 March 2009

SMRD



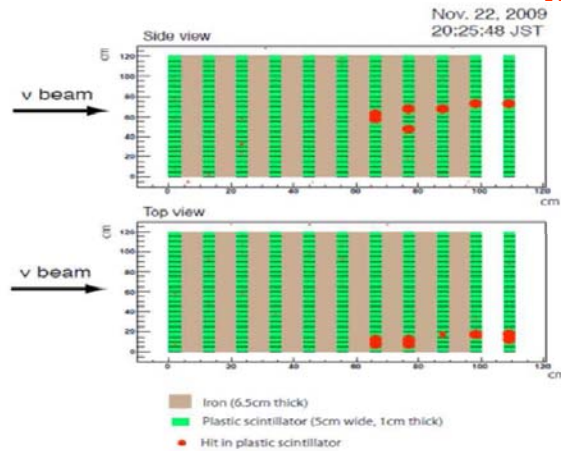
Light yield with cosmic at center of (870mm long) counter



SMRD module (4 detectors) installed into magnet yoke

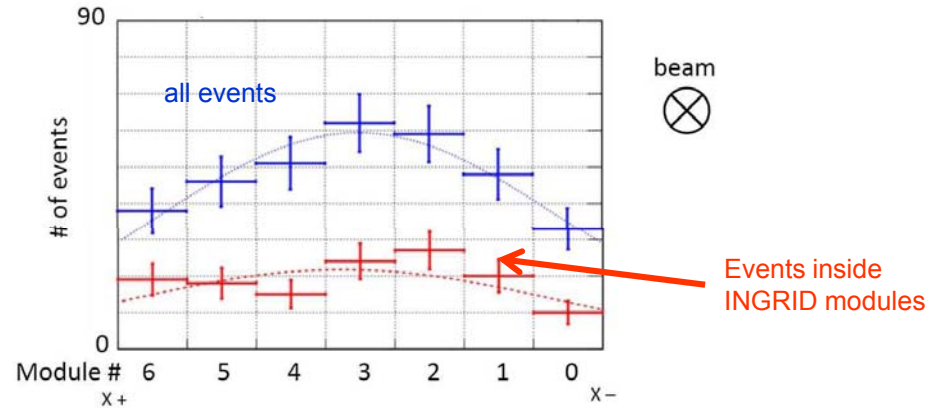
ν_μ in ND280

On-axis ν 's



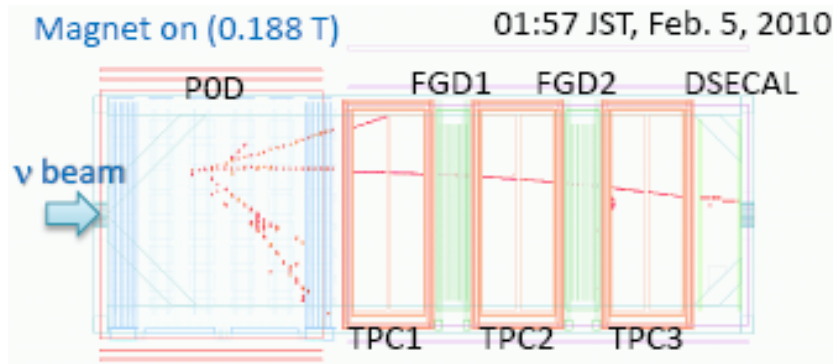
INGRID

1 day statistics, horn 320 kA

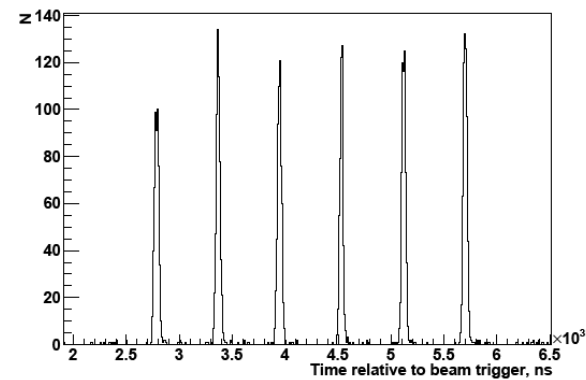


Off-axis ν 's

ν_μ event in ND280

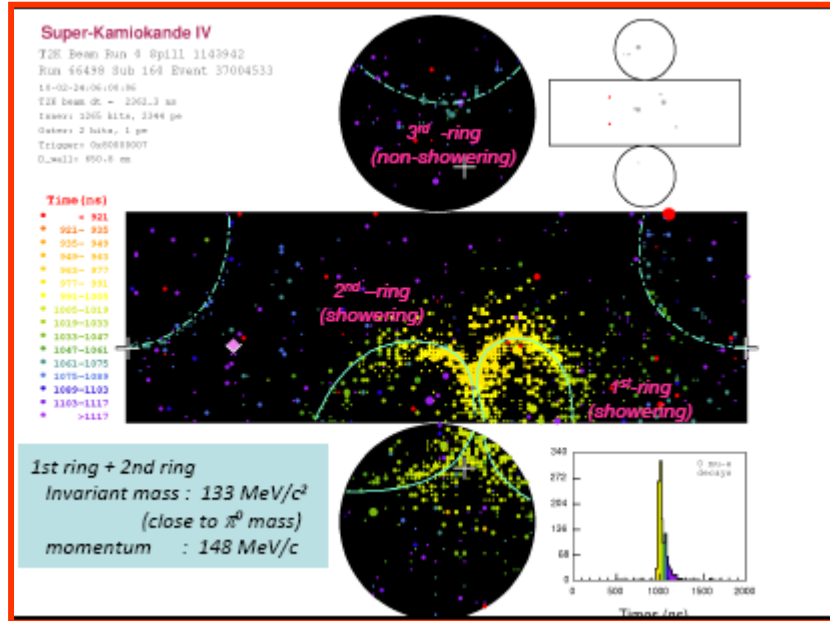


Neutrino events in SMRD



First T2K neutrino detected by SuperK

24 February 2010



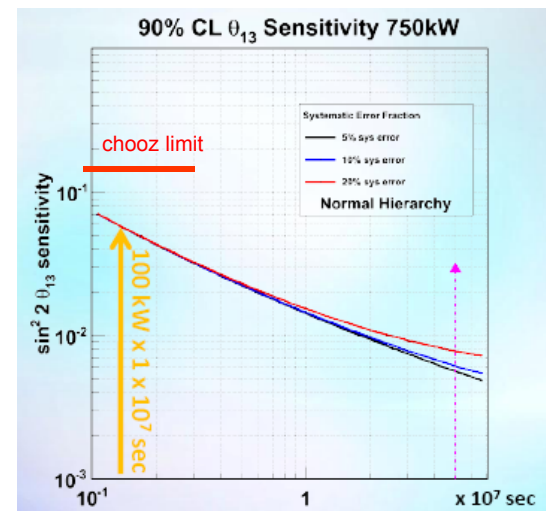
First T2K physics run

Data taking: start March 2010
end July 2010

100kW, 30 GeV, 10^7 sec

$\nu_\mu \rightarrow \nu_e$

3.7 events at CHOOZ limit
background 0.25 (ν_μ NC) 0.39 (beam ν_e)



$\nu_\mu \rightarrow \nu_\mu$

(FCFV μ -like)

null oscillation

oscillation

All	183.2	64.4
CCQE	118.0	22.9
CC non-QE	58.7	35.1
NC	6.5	6.5

oscillation
parameters

$$\sin^2 2\theta_{23} = 1.0$$

$$\Delta m^2_{23} = 2.4 \times 10^{-3} \text{ eV}^2$$

$$L = 295 \text{ km}$$

Expected sensitivity

