OPERA: Electronic Detectors

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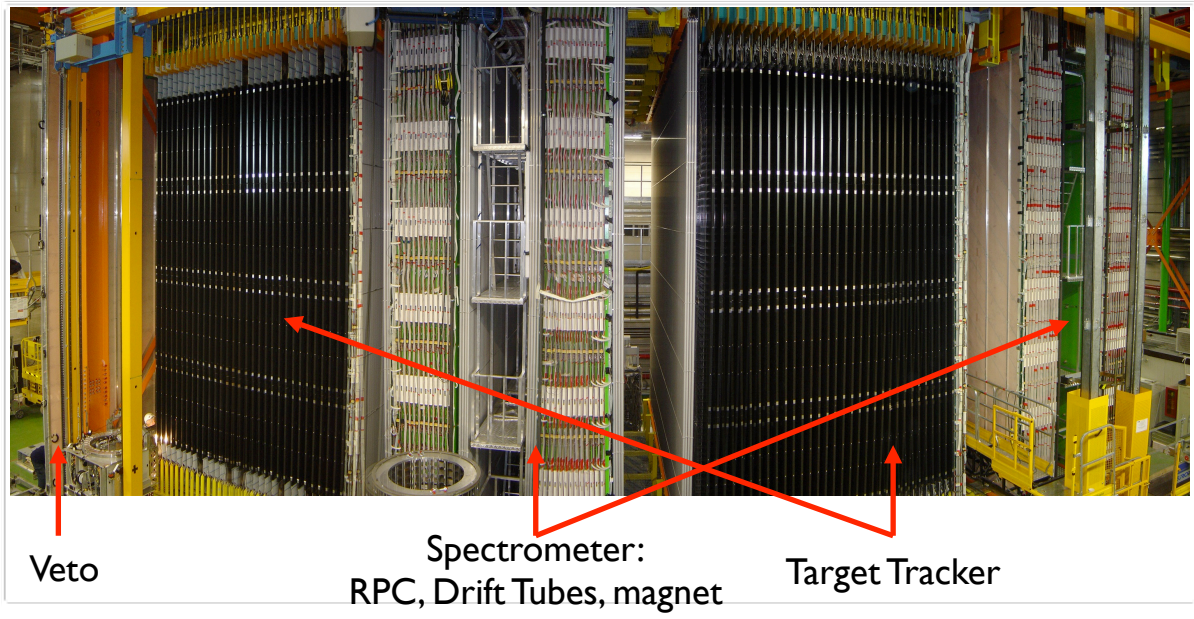
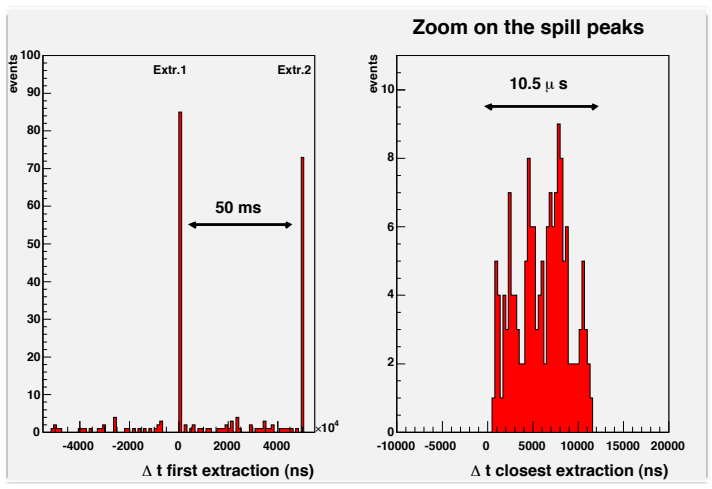
on behalf of the OPERA collaboration



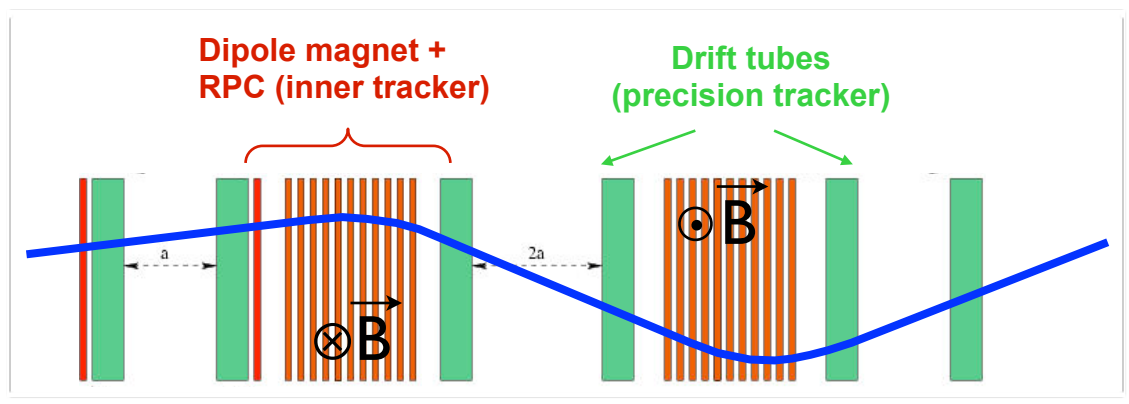
Each strip, made of polystyrene, 2% of p-Terphenyl and 0.02% of POPOP, is 1 cm thick with a wavelength shifting fibre grooved in the middle.

The fibres are connected in groups of 64 to multi-anode Hamamatsu PMTs (63488 electronic channels).

The photo electrons measured due to a m.i.p. are more than 5 and the detection efficiency is larger than 99%.



The "**neutrino event**" is defined asking for at least 2 XY coincidences in the target tracker (threshold at 1 photo electron) in time with the CNGS clock.



The electronic detectors have been working since 2006.

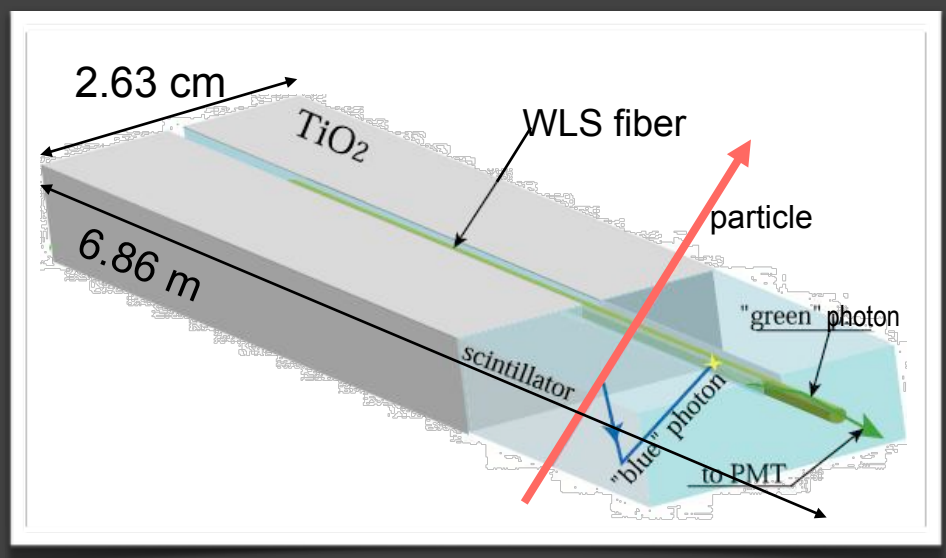
Opera is an hybrid detector (made up of electronic detectors and emulsions) divided into two identical supermodules.

The goal of the experiment is the direct measurement of the ν_μ to ν_τ oscillation.

In each supermodule, the electronic detectors consist of a **target tracker** followed by a **spectrometer**.

The main goals of the target tracker are the **trigger** on the neutrino events and the **location of the interaction** inside the target.

It is composed by 62 walls (X and Y projection in each wall) of plastic scintillator strips.



The goal of the spectrometer is the **momentum measurement** and **charge discrimination**.

In particular it is used to measure and identify muons, in order to reduce charm background.

It is made by inner tracker (Resistive Plate Chambers planes) and precision tracker (Drift Tubes) in a 1.5 T magnetic field.

ε miss charge	0.1%-0.3%
Δp/p (<50 GeV/c)	~ 20%
μ ID (with Target Tracker)	~ 95%

Studies on the **comparison between data and Monte Carlo** have been performed, both on the muon and on the hadronic shower.

The plot below shows the very good agreement obtained for the muon momentum.