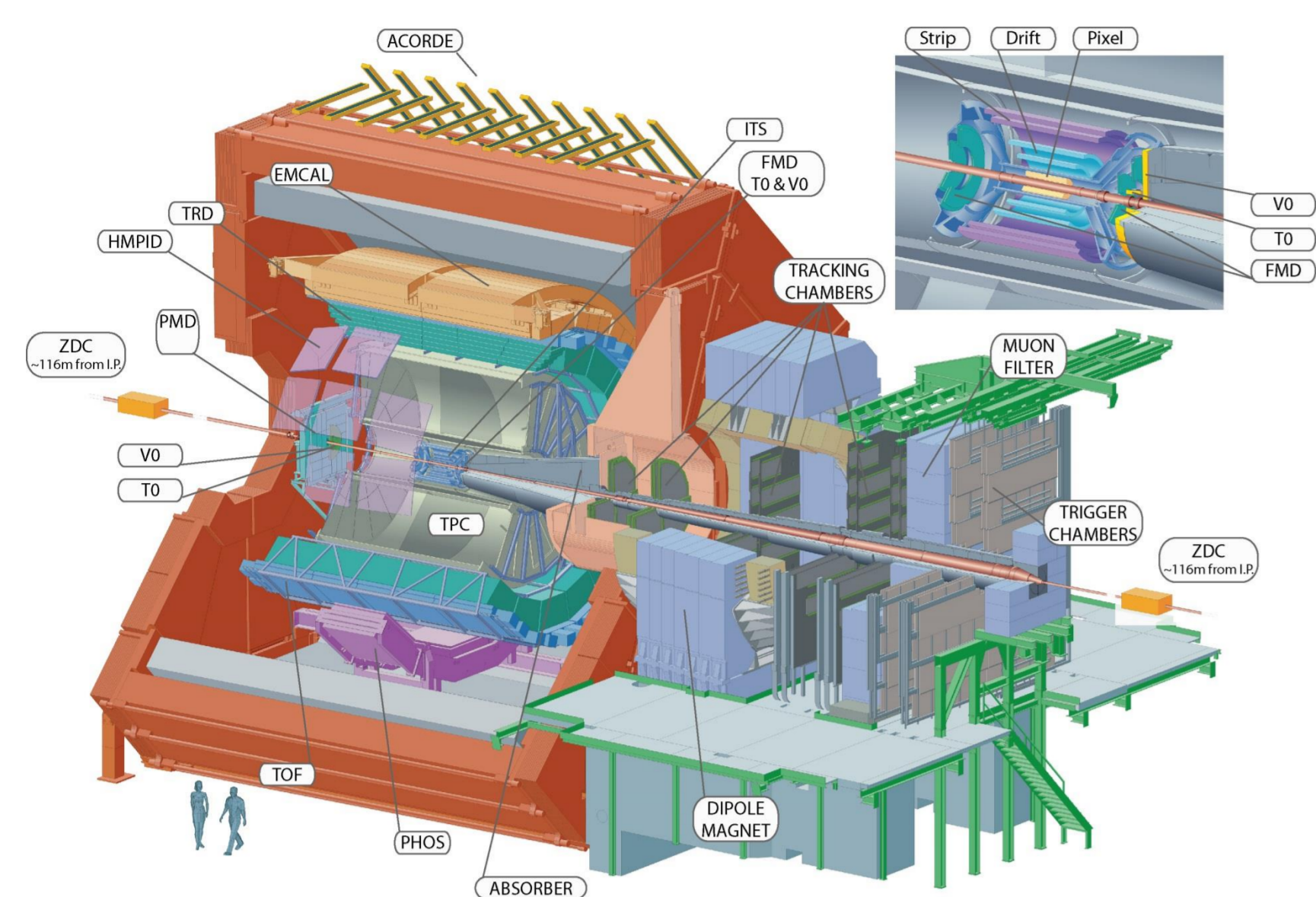


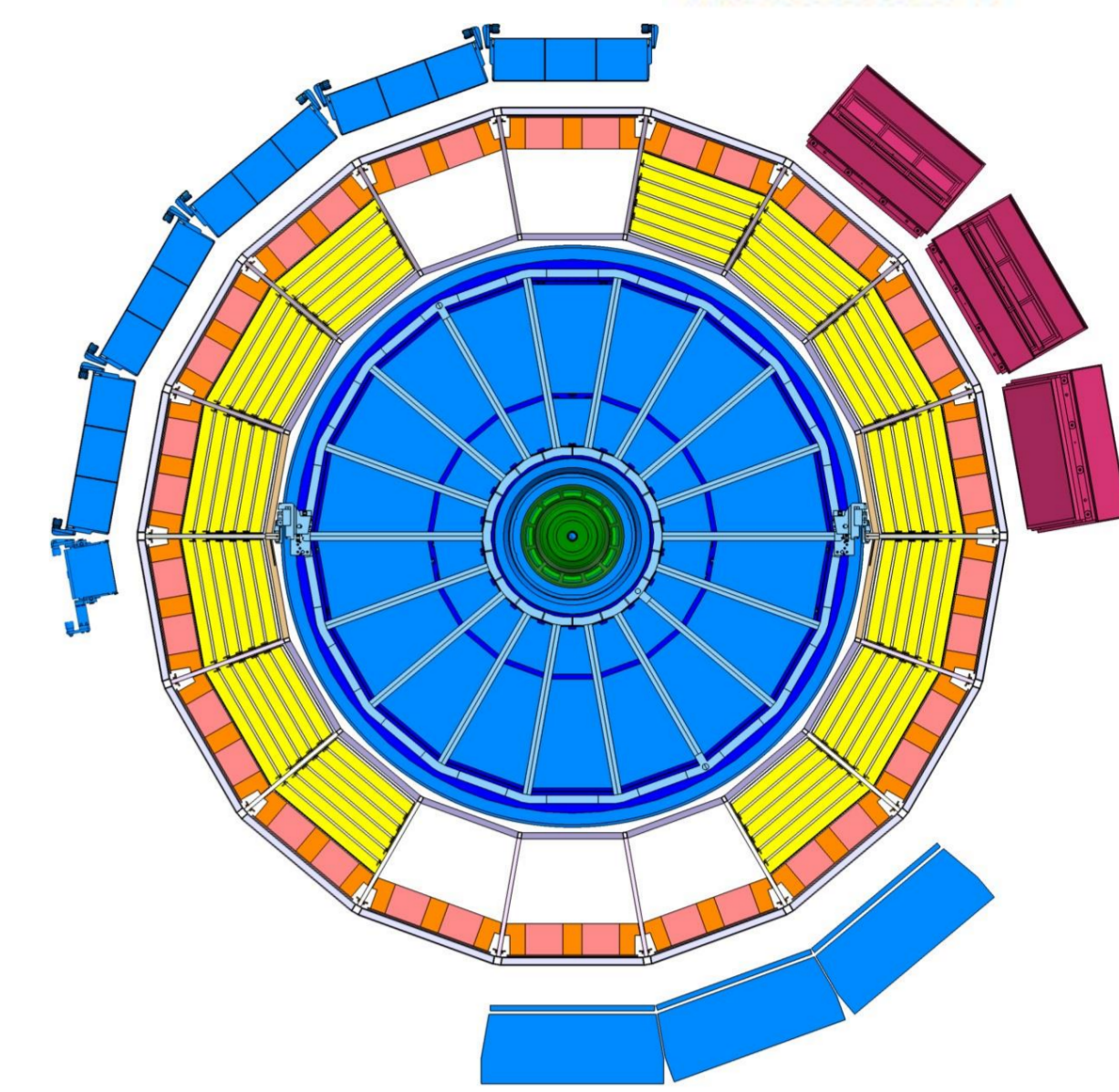


Performance of the ALICE/PHOS in the LHC Run1

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for the ALICE Collaboration



ALICE is the heavy-ion experiment at the CERN Large Hadron Collider. The experiment continuously took data during the first physics campaign of the machine from fall 2009 until early 2013, using proton and lead-ion beams. The ALICE apparatus has overall dimensions of $16 \times 16 \times 26$ m³ and a total weight of $\sim 10\,000$ t. It was designed to cope with the particle densities expected in central Pb–Pb collisions at the LHC. The experiment has a high detector granularity, a low transverse momentum threshold $p_{minT} \approx 0.15$ GeV/c and good particle identification capabilities up to 20 GeV/c. The seventeen ALICE detector systems fall into three categories: central-barrel detectors, forward detectors, and the MUON spectrometer.



The PHOton Spectrometer (PHOS) is a high resolution electromagnetic spectrometer which detect electromagnetic showers at central rapidity and provides photon identification as well as neutral meson identification through the two-photons decay channel. PHOS in Run1 consists of three individual units, named modules. PHOS is located inside the ALICE magnet at a distance of 4.6 m from the interaction point and covers 60° ($260^\circ < \phi < 320^\circ$) in azimuthal angle and $|\eta| < 0.12$ in pseudorapidity.

PHOS module is divided into a warm and a cold volume. All detection units are placed inside the cold volume at a stabilized temperature of -25°C with precision 0.033°C . This arrangement allows to increase the light yield of the crystals by a factor ~ 3 compared to room temperature and to decrease considerably the electronics noise. The readout and trigger electronics (FEEC, TRU etc.) is placed inside the warm volume at room temperature.

Raw materials:

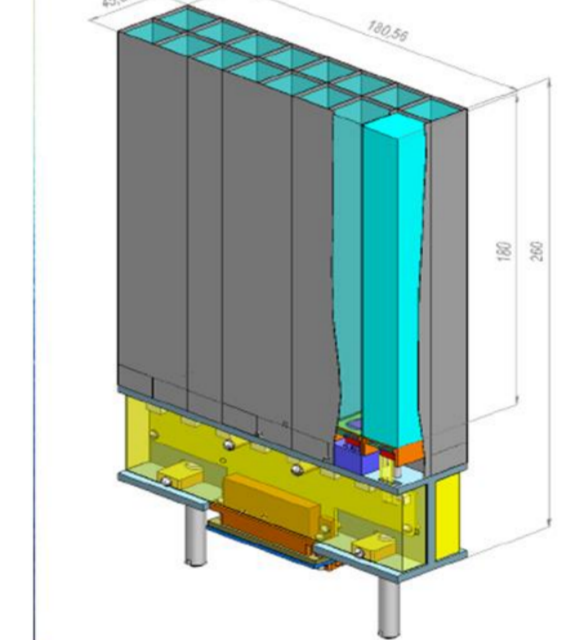
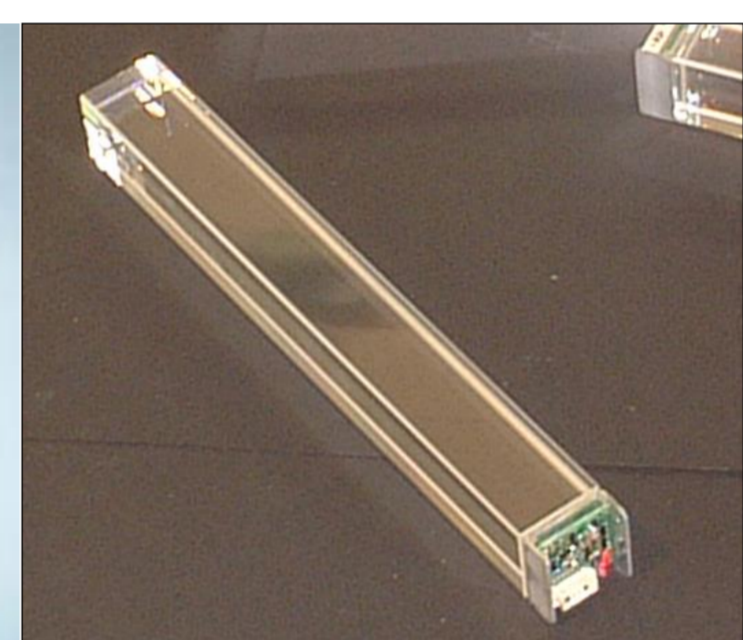
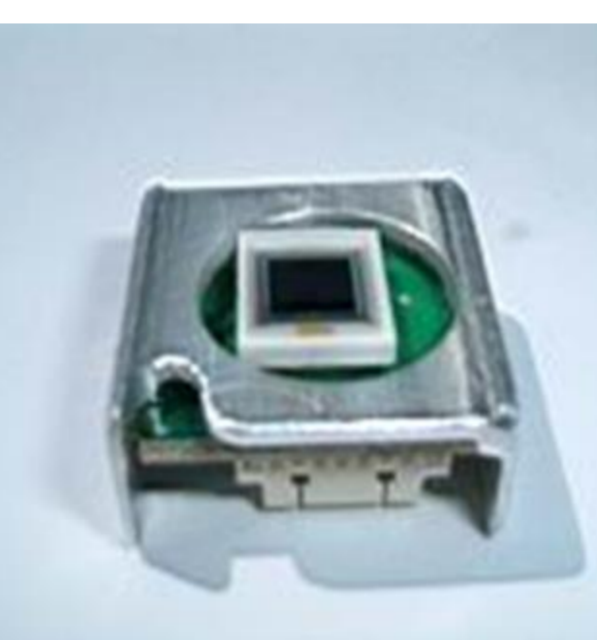
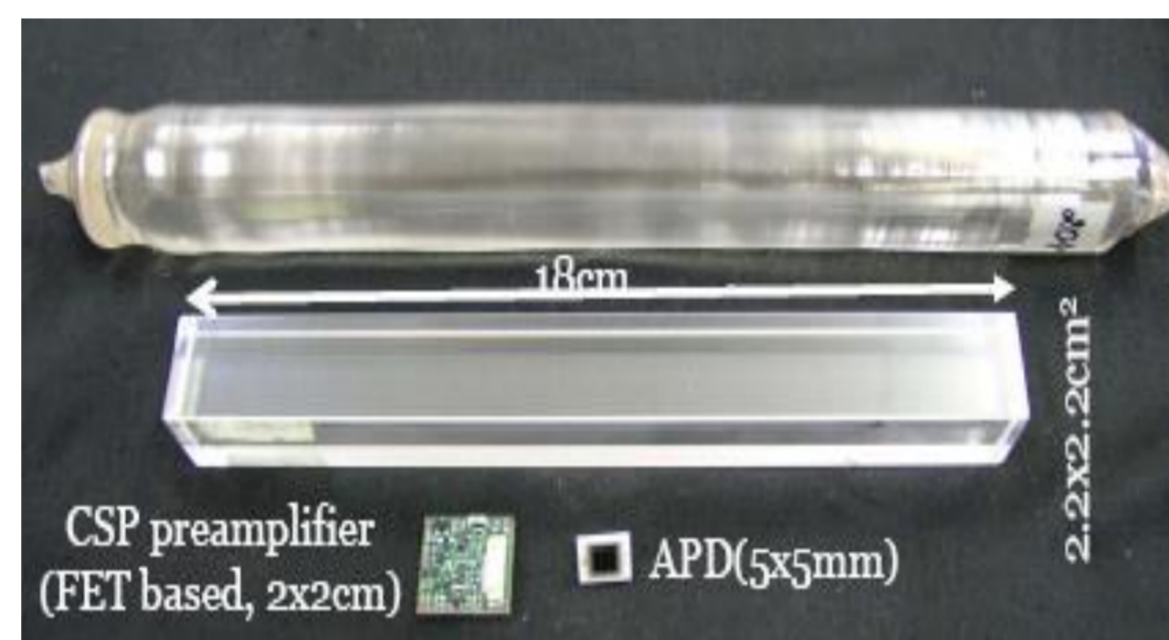
22 x 22 x 180 mm PWO crystal,
HAMAMATSU S8148 (S-8664-55) APD,
low noise CSP

Photodetector
Assembly of CSP and APD

Detection channel
Assembly of photodetector and crystal

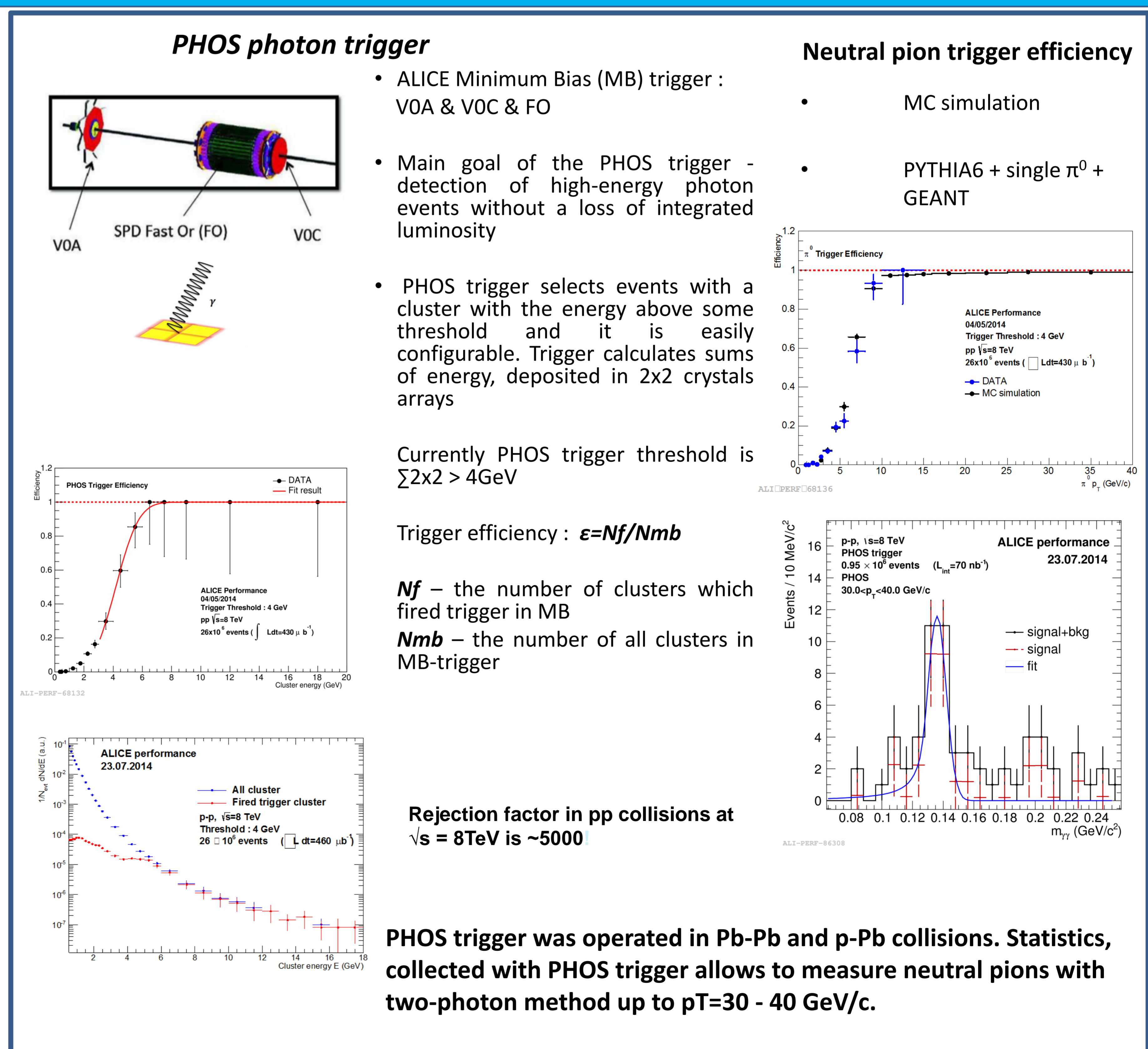
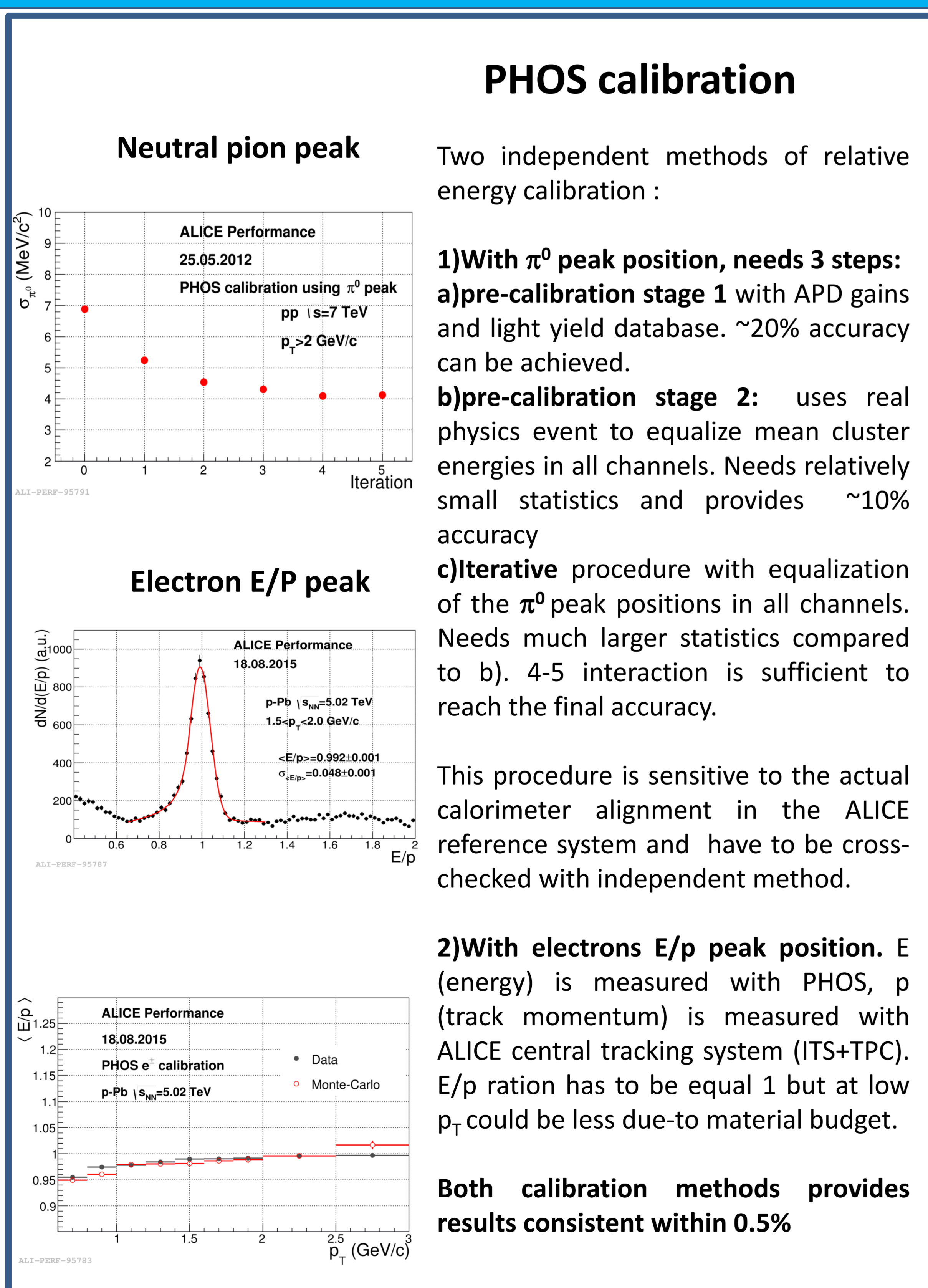
Strip unit (SU)
assembly of 2x8
detection channels

PHOS module (224 SU)



PHOS installation in the L3 magnet

Basic PHOS units



The ALICE PHOS calorimeter has been designed, constructed, assembled and successfully operated during LHC Run1 by physicists and engineers from 13 Institutes from 8 Countries, and 2 International Organizations.