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## KLOE-2 Inner Tracker: the First Cylindrical GEM Detector

*Thursday, July 6, 2017 10:30 AM (15 minutes)*

KLOE-2 at the  $e^+e^-$  DAΦNE collider, is the main experiment of the INFN Laboratori Nazionali di Frascati (LNF) and is the first high-energy experiment using the GEM technology with a cylindrical geometry, a novel idea developed at LNF exploiting the kapton properties. The experiment is the continuation of KLOE, upgraded with state-of-the-art technology to improve its discovery potential, with a new physics program mainly focused on the study of  $K_s$ ,  $\eta$  and  $\eta'$  decays as well as on kaon interferometry, test of discrete symmetries, and search for physics beyond the Standard Model. Four concentric cylindrical triple-GEM detectors compose the Inner Tracker which has been inserted around the interaction region and before the inner wall of the pre-existing KLOE Drift Chamber, at distances from 130 mm to 205 mm, to improve the resolution on decay vertices close to the interaction point (IP) reconstructed from low-momentum charged secondaries. State-of-the-art solutions have been expressly developed or tuned for this project: single-mask GEM etching, multi-layer XV patterned readout circuit, PEEK spacer grid, GASTONE front-end board, a custom 64-channel ASIC with digital output, and the Global Interface Board for data collection, with a configurable FPGA architecture and Gigabit Ethernet. Alignment and calibration of a cylindrical GEM detector was never done before and represents one of the challenging activities of the experiment. The first set of alignment and calibration parameters obtained with cosmic-ray muons has been used with Bhabha scattering events to validate the integrated tracking using both Inner Tracker and Drift Chamber information, exploiting the Kalman filter technique. Data taking campaign started in November 2014, reached  $3.5 \text{ fb}^{-1}$  integrated luminosity and is presently ongoing with the aim of collecting more than  $5 \text{ fb}^{-1}$  by March 2018.

The Inner Tracker detector operation, calibration and performance will be presented.

### Experimental Collaboration

KLOE-2 Collaboration

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