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Construction and commissioning of the KLOE-2 Inner Tracker

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The KLOE-2 experiment is starting its data taking at the DAΦNE ϕ -factory at the Frascati National Laboratory of the INFN. The experiment is continuing the successful physics program of KLOE, that collected 2.5 fb⁻¹ of integrated luminosity between 2001 and 2006. For the new data taking campaign the detector, consisting of a huge Drift Chamber and a Electromagnetic Calorimeter working in a 0.5 T axial magnetic field, has been upgraded. One of the upgrades involves the tracking system, with the insertion of a GEM-based detector in the space separating the DAΦNE interaction region and the inner wall of the Drift Chamber. The Inner Tracker, composed of four coaxial cylindrical triple-GEMs, is a kapton-based detector allowing us to keep the total material budget below 2% X₀, as required in order to minimize the multiple scattering of low-momentum tracks. Novel and advanced solutions were developed to cope with the challenging problems that arose during the construction phase. The tracker achieves 200 μm spatial resolution in the transverse plane and 500 μm along the beam direction. The two coordinates are provided by a dedicated XV readout pattern coupled to the GASTONE front-end, a 64 channel ASIC with digital output specially developed for this detector. The first results from the commissioning of the detector will be shown, including the preliminary response of the detector to cosmic-ray muons and DAΦNE beam interactions.

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