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The KLOE-2 detector upgrade at DAFNE

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The KLOE experiment at the DAFNE e+e- collider of the Frascati
Laboratories of INFN is about to start a second data-taking campaign (KLOE-2). The interaction region of DAFNE has been modified using a crabbed waist scheme.

The KLOE-2 scientific program aims to further improve the precision studies on kaon and low energy hadron physics, e.g. CKM unitarity and lepton universality, CPT symmetry and quantum mechanics tests, low energy QCD and the contribution of hadron vacuum polarization to muon anomalous
moment.

The detector has been upgraded with small angle electron taggers to extend the physics program to gamma-gamma physics: two stations of LYSO crystal calorimeters read-out by SiPM for the detection of low energy e+/e- (LET), and two scintillator hodoscopes to detect high energy e+/e- (HET). The LET have been assembled, installed and integrated in the KLOE DAQ system for data taking. The Roman pots for the insertion of the HET stations have been realized, equipped with step-motors for the positioning inside the beam pipe, and used for housing test scintillators to measure the background levels.

Further detector upgrades include the insertion near the interaction point
of an inner tracker (IT) to improve the reconstruction performance for low momentum tracks. The adopted solution is a low-mass, fully cylindrical and dead-zone free GEM based detector. After three years of R&D the construction of the first layer has started, with the aim of completing the detector by middle of 2012. The front-end electronics is based on the GASTONE ASIC, specifically developed for this detector, a charge amplifier with digital output integrating 64 channels in one single chip.

To increase acceptance for photons emitted at very small angles and to improve the reconstruction of photons hitting the DAFNE quadrupoles, small crystal calorimeters (CCALT) and tile calorimeters (QCALT) will be installed inside the KLOE-2 detector.

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Classification de Session: Detector R & D and Data Handling

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