Figure 6: Overall view of the KLOE magnet.

4.4 Tracking

A He-based, very transparent, drift chamber will reconstruct the $\pi^+\pi^-$ final state, reject the $K_{\ell 3}$ background, and determine the K_S^0 flight direction and the decay vertices; the choice of a drift chamber over a time-projection chamber was dictated by the need to sustain high event rates in the Bhabha region. The KLOE drift chamber has space resolution $\sigma_{\rho,\phi} = 200\,\mu m$ and $\sigma_z = 3\,mm$, 0.5% relative resolution on the transverse momentum, and a $\geq 98\%$ track reconstruction efficiency averaged over the $K_L^0 \to \pi^+\pi^-$ decay. The mechanical structure is defined, and tender procedures are in progress to locate a manufacturer. The machinery to string some 27,000 wires is in construction. A further beam test on a 3.7-m-long prototype is planned for June 1995 at CERN.

4.5 Triggering and Background Rejection

To achieve the required statistical sensitivity, the entire ϕ event rate (5 kHz) has to be written on tape. The calorimeter will provide triggering for most of the decay channels of interest. The rejection of three neutral-pion decays relies on the calorimeter's hermeticity and efficiency for photons down to 20 MeV energy. The rejection of the $K_{\mu 3}$ decay over the $\pi^+\pi^-$ decay of interest is based on several kinematical variables and constraints. The high-resolution features of the tracking limits the residual contamination to 4.5×10^{-4}, at a 6 kG solenoidal field, with a 99.8% $\pi^+\pi^-$ efficiency.

5 Conclusions

A wealth of physics ranging from CP violation to hypernuclear studies is expected from $DA\Phi NE$. The beginning of machine commissioning is planned for December 1996; construction of the detectors is well under way.

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