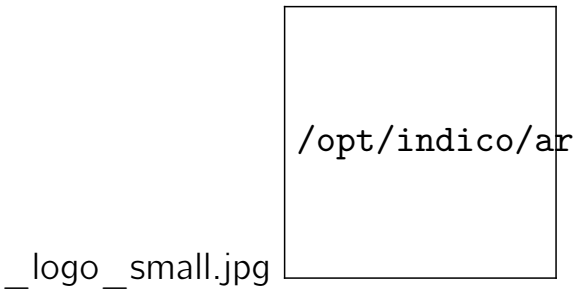

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The construction technique of high granularity and high transparency Drift Chambers for the MEG II upgrade

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Content

The MEG experiment searches for the charged lepton flavor violating decay, $\mu^+ \to e^+\gamma$. MEG has already determined the world best upper limit on the branching ratio $BR < 4.2 \times 10^{-13}$@90%CL. An upgrade of the whole detector has been approved to obtain a substantial increase in sensitivity. Currently MEG is in upgrade phases, this phase involves all the detectors. The new positron tracker is a single volume, full stereo, small cells drift chamber(DC) co-axial to the beam line. It is composed of 10 concentric layers and each single drift cell is approximately square 7 mm side, with a 20 μm gold plated W sense wire surrounded by 40 μm and 50 μm silver plated Al field wires in a ratio of 5:1, about 12,000 wires. Due to the high wire density ($12 wires/cm^2$), the use of the classical feed-through technique as wire anchoring system could hardly be implemented and therefore it was necessary to develop new wiring strategies. The number of wires and the stringent requirements on the precision of their position and on the uniformity of the wire mechanical tension impose the use of an automatic system to operate the wiring procedures. This wiring robot, designed and built at the INFN Lecce and University of Salento laboratories, consists of:

- a semiautomatic wiring machine with a high precision on wire mechanical tensioning (better than 0.5 g) and on wire positioning (20 μm) for simultaneous wiring of multiwire layers;
- a contact-less infrared laser soldering tool;
- an automatic handling system for storing and transporting the multi-wire layers.

The drift chamber is currently under construction at INFN and should be completed by the end of summer 2017 to be then delivered to PSI for commissioning.

Summary

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