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Pellet target development for storage ring EDM polarimetry

Content

The JEDI (Jülich Electric Dipole moment Investigations) collaboration in Jülich is conducting a set of experiments at the COSY accelerator and storage ring, aiming to develop experimental techniques to measure the EDMs of charged particles, like proton and deuteron. One of the key elements of these experiments is the modular polarimeter (JEPO) with a special target system.

In the current configuration, horizontal and vertical block targets are used in the polarimeter. Targets are mounted on stepper linear actuators and dedicated hardware and software are used to control target movements during experiments. The EPICS based target control system can access accelerator and detector data and use them as a feedback for automatic target movement or finding the proper beam position for measurement. The system is controlled by the network interface using dedicated, user friendly GUI. It has several safety modules which consist of software and hardware interlock systems.

The work on a special target system, which will oscillate carbon pellets through the beam is ongoing. The frequency and the speed of oscillation must be variable to achieve the desired effective target density. This kind of target will require a specialised monitoring and control system, consisting of several electrical and mechanical parts. The system will include precise triggering, object detection, track reconstruction and data synchronization units. Control signals and data will be exchanged using a network interface, which will provide the ability to synchronize data of the target with other systems in the detector.

In this contribution achievements and experimental results will be summarized and ongoing activities towards the dedicated ballistic pellet target development presented.

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