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A New Beam Halo Veto Detector for the MAGIX Experiment

Saturday, November 26, 2022 4:00 PM (2 hours)

The MESA accelerator will host the MAGIX experiment, which is based on the

scattering of an electron beam on a gas jet target. This enables the scattering on gases like hydrogen without scattering on any other materials before and after the scattering process. The gas jet target is realized by using a nozzle to inject the gas into the scattering chamber as well as a funnel-shaped structure called the catcher, into which the gas streams behind the interaction zone.

So-called beam halo electrons can occur in the accelerator. These do not move exactly along the beam axis and can increase background by interacting with the catcher and the nozzle. To reject these scattering reactions, the beam halo veto detector was implemented. This detector is positioned upstream of the gas jet target inside the scattering chamber. It allows the detection of single electrons by using a scintillator, a lightguide and a photomultiplier tube. Therefore, covering the front of the nozzle and the catcher with this detector allows suppressing the described background.

Category

Particle / Astroparticle / Cosmology (Experiment)

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