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Simulation studies of the beam monitor for the CSR external-target experiment

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A gaseous beam monitor is being developed for the CSR external-target experiment (CEE) at HIRFL. The requirements on the beam particle rate of up to 10^6 pps and the per-particle position resolution of better than $50 \mu\text{m}$ pose challenge on the detector design. The beam monitor mainly consists of two drift chambers, each measuring a 1D position of the beam particle transverse to the beam direction. The detector simulation has been carried out to optimize the geometrical set-up, to evaluate the expected performance, and to calculate the requirements on the custom-designed charge sensor. We will present the simulation studies of the beam monitor, which is mainly based on the Geant4, Garfield++ and COMSOL softwares. A preliminary study of the space charge effect due to the beam particles will also be discussed.

Primary author(s) : YAN, Fei (Central China Normal University)

Co-author(s) : WANG, Zhen (Guizhou Normal University); WANG, Hulin (Central China Normal University)

Presenter(s) : YAN, Fei (Central China Normal University); WANG, Zhen (Guizhou Normal University)

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