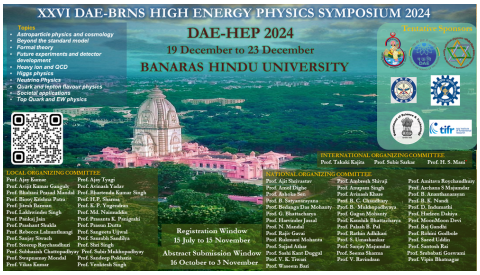

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Simulation study of different pitch sizes GEM detectors and their performance comparison

Gas Electron Multiplier (GEM) based detectors are planned to be used in future collider experiments like the High Luminosity Large Hadron Collider (HL-LHC), Electron Ion Collider (EIC) and Apparatus for Meson and Baryon Experimental Research (AMBER) because they have proven effective for tracking particles in recent experiments. In this context, we have conducted a comparative study through simulation to assess the performance of small-pitch GEM foils (90 μm and 60 μm) in comparison to the standard GEM foil with a pitch size of 140 μm. Using ANSYS and Garfield++, we have carried out single GEM simulations and confirmed the results with experimental data. The comprehensive simulation study suggests that GEM foils with smaller pitch sizes provide higher effective gain, improved spatial resolution and stable performance as GEM potential increases, which will be advantageous for future collider experiments.

Field of contribution

Experiment

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Track Classification: Future experiments and detector development