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Performance of the Scintillation Wall in the the first physics run at the BM@N Experiment

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This report presents the performance of the scintillation wall detector (ScWall) in the first physics run of the BM@N fixed target experiment with Xe+CsI reaction at 3.8 AGeV. The ScWall detects fragments with charges $Z = 1$ and $Z = 2$ in the central small scintillator detectors, while fragments with charges up to $Z = 5$ are observed in the detectors close to the beam hole. Comparisons with models revealed that DCM-QGSM-SMM and PHQMD underestimated $Z = 2$ fragments yields and overestimated those with higher Z . The results underline the need to adjust these models for a more accurate description of spectator fragment production in nucleus-nucleus collisions. In addition, centrality estimation using the total charge of ScWall showed less correlation with the impact parameter compared to FHCAL energy deposition. The purity analysis shows that minimum centrality class size based on FHCAL energy deposition should be at least 20% to achieve 80% purity. Furthermore, both ScWall and FHCAL were effective in estimating the event plane, with FHCAL demonstrating superior resolution correction, making it the preferred choice for precise flow measurements in heavy-ion collisions at BM@N.

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