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Analysis of the BRAN Forward High Luminosity Detectors at the LHC[1] BRETT GREEN, Montana State University, ALESSANDRO RATTI[2], HOWARD MATIS[3], Lawrence Berkeley National Laboratory — The Beam Rate of Neutrals detectors measure relative luminosity in the far forward regions of ATLAS and CMS at the LHC by detecting secondary showers from neutral particles using high-pressure ionization chambers. One detector is on each side, clockwise and counterclockwise, of ATLAS and CMS. Proton-proton, proton-lead, and lead-lead collisions have been measured. We have simulated the detector during all three collision types (pp, pPb, and PbPb) in the modeling program FLUKA. The detectors take measurements in both pulse height and counting modes for four separate quadrants. Pulse height mode measures changes in voltage caused by incoming particles, whereas counting mode measures the number of times a threshold was exceeded. We show that the detector can measure luminosity for all reaction types on both sides, a range extending over three orders of magnitude. We calculate crossing angle, and we quantify reaction asymmetry. We show that by comparing data with known and accepted values we may calibrate the detector.

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