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Systematic Glauber Model Study of Multiplicity Distributions from $\sqrt{s_{NN}} = 3.0$ GeV to 200 GeV at STAR[1] ZACHARY SWEGER, University of California, Davis, STAR COLLABORATION[2] — The Glauber Model has long been used in heavy-ion collisions as a method of determining centrality by simulating nucleus-nucleus collisions and producing particles using a Negative Binomial Distribution (NBD). The core task is to determine what values of the negative binomial parameters and the hardness scaling reproduce the observed distributions from data, all of which contribute to the shape of the simulated distribution. Particle production in heavy-ion collisions scales with the number of binary nucleon collisions for hard processes and with the number of participant or wounded nucleons for soft processes; the hardness scaling is an essential part of the Glauber Model and determines what fraction of produced particles are generated from soft versus hard processes. Using this hardness scaling, there is potential to learn about nucleon stopping and the energy deposition in the interaction region. STAR has collected many data sets at various energies, ranging from $\sqrt{s_{NN}} = 3.0$ GeV to 200 GeV, which provide a unique opportunity to perform a systematic scan of the hardness as a function of energy. STAR data from the RHIC Beam Energy Scans I and II, the STAR Fixed Target program, and additional energies covering the full range of collisions from RHIC will be presented.

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