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Destruction of very-high-n Rydberg atoms in Rydberg-Rydberg collisions[1] R G FIELDS, R BRIENZA, F B DUNNING, Rice Univ, S YOSHIDA, J BURGDRFER, Vienna University of Technology — The destruction of very-high-n strontium Rydberg atoms in Rydberg-Rydberg collisions is examined in an atomic beam. Rydberg blockade is exploited to produce a string of Rydberg atoms with approximately equal initial spatial separations but a distribution of velocities leading to subsequent collisions and Rydberg atom destruction through Penning ionization, which is monitored by measuring the time evolution of the high-n population. The data are analyzed using a Monte Carlo collision code that models Rydberg atom production together with their subsequent motions and collisions. Comparisons between model predictions and experimental data point to large collisional loss cross sections, on the order of 10^{-5} cm^2, that match those expected for hard-sphere collisions, i.e., $\sigma = 4\pi R_n^2$ where $R_n = 2n^2$ is the atomic radius.

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