Abstract Submitted
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State changing through very-long-range interactions in high-n, $n \geq 300$, Rydberg-Rydberg collisions[1] SHUHEI YOSHIDA, J. BURGDORFER, TU Wien, ROBERT FIELDS, ROBERT BRIENZA, F.B. DUNNING, Rice University — State changing in thermal-energy collisions between atoms in very-high-n, $n \geq 300$, Rydberg states is studied by observing the quantum beats induced by sudden application of a small dc electric field. These so-called Stark beats are shown to be sensitive to angular momentum L and are used to probe the evolution of L during collisions. The data show that, even for impact parameters as large as 50 μm, collisions lead to rapid L-changing highlighting the long-range nature of the interactions responsible. The corresponding L-changing cross sections are large, 10^{-4} cm^2, and much greater than the "hard-sphere" cross sections $4\pi r^2$, where r $\approx n^2$ is the atomic radius. The results also show that measurements of quantum beat amplitudes can provide a valuable complement to selective field ionization when investigating state-changing reactions.

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