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L-changing through very-long-range interactions in collisions between high-n, n=300, n^1F_3 strontium Rydberg atoms.[1] G. FIELDS, R. BRIENZA, F.B. DUNNING, Rice University, S. YOSHIDA, J. BURGDORFER, Institute for Theoretical Physics, Vienna University of Technology — Studies of state-changing in collisions between high-n Rydberg atoms are analyzed. While close collisions result in ionization of an atom, even at large distances the dipole-dipole interaction generates an effective electric field at each atom triggering Stark precession and L-changing which is examined using both classical and quantum theory. The theoretical predictions are tested experimentally using high-n n^1F_3 strontium atoms and the results show that, even for impact parameters as large as 40 μm, collisions can lead to rapid L-changing, highlighting the long-range nature of the interactions responsible.

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