Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

The effect of DC electric fields on nP cold Rydberg collisions

JORGE KONDO, JADER CABRAL, LUIS GONÇALVES, LUIS MARCASSA, Universidade de São Paulo, DONALD BOOTH, JAMES SHAFFER, University of Oklahoma — We have investigated the role of the dc Stark effect on population transfer to the nS state 100 ns after the excitation of nP Rydberg atoms in a Rb magneto-optical trap (MOT) for $32 \leq n \leq 36$. The nS population was measured as a function of the principal quantum number, as a function of the dc electric field, and as a function of the nP atomic density. The time evolution of the nS population was also measured up to 10 μs after the nP+nP state excitation. The electric fields are scanned through the Forster resonance between 0 and 12 V/cm. The experimental results are compared to a theoretical model to calculate the probability of a transfer of population between the two states, taking into account dipole-dipole, dipole-quadrupole, and quadrupole-quadrupole interactions as well as the dc Stark effect. We should stress that the nP case is simpler than our previous work involving nD+nD states [1], since there are fewer potential curves involved in the process.


Work supported by FAPESP, CNPq, INCT-IQ, AFOSR (FA9550-09-1-0503), ARO (W911NF-08-1-0257), NSF (PHY-0855324) and NSF (OISE-0756321).