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Cold Rydberg atoms in a CO_2 optical dipole trap[1] LUIS GONÇALVES, JORGE KONDO, JADER CABRAL, LUIS MARCASSA, University of Sao Paulo — There has been increasing interest in cold Rydberg atoms over the last several years. The primary reason for this attention is that interactions between Rydberg atoms are strong and lead to many interesting and useful phenomena, which require high atomic density samples. In this work, we have built an experimental setup to investigate cold Rydberg atom collision in a CO_2 optical dipole trap. Briefly, we have loaded a Rb standard magneto-optical trap from an atomic vapor provided by a dispenser. Then we turn on 100W CO_2 dipole trap and we apply a loading phase, in which the repumper light intensity is reduced and the trapping frequency is detuned to the red. After this phase, the trapping and repumper laser beams are turned off and we wait 100ms for the atoms, that were not trapped, to fall off the dipole trap region due to gravity. Finally, we turn off the dipole trap and excite the Rydberg state using a two photon transition. The Rydberg atoms are detected using pulsed field ionization technique. During the presentation we shall present preliminary results involving collisions between nD states.

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Luis Marcassa
University of Sao Paulo

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