

Abstract Submitted  
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**Measurement of Ion-Collisional Frequency through Optical Pumping in Ultracold Neutral Plasmas** JOSE CASTRO, THOMAS KILLIAN, Rice University — Ion-collisional frequency measurements were performed in Strontium Ultracold Neutral Plasmas (UNP) through optical pumping between the two ground level spin states. The spin states of the ground and excited levels of a Sr ion form a  $\Lambda$  energy configuration when coupled with the appropriate circularly-polarized light. Optical pumping from one ground level spin state to the other is strongly affected by collisions between ions. Fluorescence measurements of this process show that velocity changing collisions between ions slow down the pumping rate into the “dark” ground level spin state. Fluorescence measurements were modeled by a set of coupled rate equations to calculate the ion-collisional frequency.

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