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The role of two body interaction on the broadening of a Förster resonance JORGE KONDO, LUIS GONCALVES, JONATHAN TALLANT, University of Sao Paulo, DONALD BOOTH, JAMES SHAFFER, University of Oklahoma, LUIS MARCASSA, University of Sao Paulo — Since the early days of ultracold Rydberg atom physics, many-body effects in ultracold trapped alkali gases has been of central interest. The first experiments in this field involved the study of Förster resonances as a function of atomic density. We present a study of a dc electric field tuned Förster resonance involving 37D state Rb atoms in a high density atomic sample held in an optical dipole trap. Our results show that as the atomic density increases, the resonance linewidth increases until the resonance peaks merge. Simultaneously, we measure the 39P state population which is produced through interactions between 37D atoms. It is shown that the 39P population depends quadratically on the total Rydberg 37D atomic population. A theoretical model that takes into account the multilevel character of the interaction and Rydberg atom blockade process using only pair interactions was implemented to explain the results. The comparison between the experimental data and the model is very good, suggesting that the Föster resonance process is dominate by two-body interaction. This work was supported by Fapesp, NSF and INCT-IQ.

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