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Control and analysis of atomic breakup dynamics NISHSHANKA ARUMA HANDI DESILVA, SACHIN SHARMA, DANIEL FISCHER, Missouri University of Science & Technology — Understanding the dynamics of coupled few-body systems is one of the most fundamental and challenging tasks in physics. The theoretical obstacle is solving the equations of motion, which is analytically not possible for more than two-bodies. Therefore, the advancement of our knowledge on few- and many- body phenomena relies on the comparison of theoretical predictions with detailed experimental observations. The experimental study of few-body dynamics requires, first, the control of the system in a well-characterized initial state and second, the analysis of the evolution of the system after an external interaction. In this poster, we report on an experiment, where laser cooling and manipulation techniques are employed for controlling atomic few-body system (Lithium atoms) by exciting, trapping, and cooling the atoms even to degeneracy. For the analysis, a 'reaction microscope' is used to coincidently measure the momenta of atomic fragments after ionization. This is achieved in a MOTReMI, the unique implementation of a magneto-optical trap in a reaction microscope. There are fundamental and diverse questions, to be answered in the planned experiments, among them: How ionization dynamics and timing depend on electronic correlation and relative helicity of field and atom? How does the environment of the atoms influence their ionization? How to image the correlated wave function of atomic samples in dependence on the particle number, interaction type and strength?

Nishshanka Aruma Handi DeSilva
Missouri University of Science & Technology

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