Ultracold Three-body Elastic Scattering in the Adiabatic Hyperspherical Representation\textsuperscript{1} VICTOR COLUSSI, JOSE D’INCAO, JILA, NIST and Department of Physics, University of Colorado, Boulder, Colorado, CHRIS GREENE, Department of Physics and Astronomy, Purdue University, West Lafayette, Indiana, MURRAY HOLLAND, JILA, NIST and Department of Physics, University of Colorado, Boulder, Colorado — In the past few years, advances in ultracold quantum gases together with the ability to control interatomic interactions have opened up important questions related to three-body contributions to collective phenomena observables. In order to theoretically understand such contributions one needs to explore the three-body elastic scattering problem, which is fundamentally different than its two-body counterpart. The main difficulty is in the necessity to determine contributions to three-body scattering that originate from multiple scattering events where two atoms interact while the third spectates \cite{1}. These contributions must be subtracted out in order to determine scattering events that are truly of a three-body nature, i.e., collision events in which all three atoms participate. Here, we study this problem in the adiabatic hyperspherical representation and identify how unwanted two-body scattering events manifest in this picture. This opens up ways to develop a simple procedure capable of extracting truly three-body contributions to elastic scattering. \cite{1} R. D. Amado and M. H. Rubin, Phys. Rev. 25, 194 (1970).

\textsuperscript{1}This work was supported by the U. S. National Science Foundation.

Victor Colussi
University of Colorado, Boulder

Date submitted: 29 Jan 2016

Electronic form version 1.4