Computing Solutions of the Schrodinger Equation for Coupled Channels Nuclear Scattering Problems with Non-Local Potentials using the R-Matrix Method[1] BENJAMIN SLIMMER, Clemson Univ, JOEY BONITATI COLLABORATION, WEICHUAN LI COLLABORATION, DR. GREGORY POTEL COLLABORATION, DR. FILOMENA NUNES COLLABORATION — The calculable R-matrix method has been shown to be an efficient method for describing scattering states from nuclear interactions. The method has been applied with success to calculate solutions to the Schrodinger equation in two body, single channel scattering reactions. The purpose of this study is to extend the R-matrix method to calculate solutions to a non-local, coupled channels reaction. Such a method will calculate wavefunctions using the local and non-local interactions within each channel, and also include coupling potentials between the channels. We use the Woods-Saxon and Perey Buck potential models for the local and non-local potentials. Calculating solutions for a coupled channels scattering problem is approached by using the R-matrix method with a Lagrange mesh. While this study focused on a two coupled channels case, the method could be applied to more channels, at the cost of more computation time with each additional channel.

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