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A diabatic hyperspherical method for three-body recombination rates: application to H + H + He → H_2 + He[1] NICOLAIS L. GUEVARA, Department of Physics. Kansas State University, W. BLAKE LAING, Department of Physics & Astronomy, Rowan University, BRETT D. ESRY, Department of Physics. Kansas State University — The formation of the hydrogen molecule through three-body recombination reactions was very important in the early universe. During the last decade, we have seen important progress in the calculation of three-body recombination rates. Most of them, however, have been focused on ultracold temperatures. Here, we present a method to study three-body recombination reactions that can handle temperatures of astrophysical interest and also many diatomic states. Our method introduces diabatic states in hyperspherical coordinates based on physical arguments to simplify the numerical calculations. In the present work, we have studied the reaction H + H + He → H_2 + He in order to test the utility and efficiency of our approach. Prospects for extending our method to other systems will be discussed.

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Nicolais L. Guevara
Department of Physics. Kansas State University

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