Analytic coupled channel calculation of ultracold three-body collision rates[1] EDMUND MEYER, B.D. ESRY, Department of Physics, Kansas State University — We analyze three-body recombination for positive two-body s-wave scattering lengths. Using the adiabatic hyperspherical representation as a starting point, we introduce coupling between the three-body continuum and the weakly bound diatom plus atom channel in the vicinity of $R \sim a$—the location where rigorous calculations have shown the coupling to peak [1]. In order to model loss to deeply bound diatom channels, we introduce a complex short-range K-matrix. Analytic expressions for the loss rates are derived and we recover the behavior found previously [2], including the overall a^4 scaling for identical bosons as well as the log-periodic modulation due to Efimov physics. Our formulation permits straightforward extensions to other symmetries and higher energies.

[1] J. P. D'Incao and B. D. Esry, Phys. Rev. A 72, 032710 (2005)

[2] B. D. Esry, C. H. Greene, and J. P. Burke, Jr., Phys. Rev. Lett. 83, 1751 (1999).

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