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Prediction of Feshbach resonances from three input parameters THOMAS M. HANNA, Atomic Physics Division, NIST, EITE TIESINGA, PAUL S. JULIENNE, Joint Quantum Institute, University of Maryland and NIST — We have developed a model of Feshbach resonances in gases of ultracold alkali metal atoms using the ideas of multichannel quantum defect theory. Our model requires just three parameters describing the interactions - the singlet and triplet scattering lengths, and the long range van der Waals coefficient - in addition to known atomic properties. Without using any further details of the interactions, our approach can accurately predict the locations of resonances. It can also be used to find the singlet and triplet scattering lengths from measured resonance data. We apply our technique to ^{6}Li–^{40}K and ^{40}K–^{87}Rb scattering, obtaining good agreement with experimental results, and with the more computationally intensive coupled channels technique.

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