

Abstract Submitted  
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**Three-body parameter for ultracold atoms**<sup>1</sup> YUJUN WANG, PAUL S. JULIENNE, Joint Quantum Institute, University of Maryland and NIST — The recent experimental observations of a universal three-body parameter near broad Feshbach resonances in ultracold gases have attracted great interests in the study of the fundamental physics behind. By employing multichannel two-body interactions, we numerically study the extent of the universality in the three-body parameter for atoms near Feshbach resonances with arbitrary widths. In particular, we show the role of the resonance width and the background scattering length in determining the three-body parameter and the general scaling of three-body recombination. Previous results based on the the effective-range modeling of Feshbach resonance parameters are also compared with our present study. By varying the background state in the open channel and the resonant state in the closed channel, we predict the range of the resonance parameters where the three-body parameter and/or the three-body recombination rate should be universal. The knowledge of such universality will greatly benefit the experimental manipulations of ultracold atoms near an arbitrary Feshbach resonance.

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