Abstract Submitted
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Three-body scattering dynamics of ultracold magnetic lanthanides[1] SVETLANA KOTOCHIGOVA, MING LI, Temple University, CONSTANTINOS MAKRIDES, JQI and NIST, ALEXANDER PETROV, Temple University, EITE TIESINGA, JQI, QuICS, and NIST — We theoretically investigate the origin of an extremely strong temperature dependence of the Feshbach-Fano (FF) resonance profiles observed experimentally [1,2] in atom-loss spectra of magnetic lanthanides, Dy and Er. This temperature dependence leads to a rapid increase of resonance density in these recombination spectra. We show with a resonant scattering model that the Wigner-threshold power law of the three-body recombination rate as a function of collision energy is very different for s- and d-wave entrance channels. Our resonance profiles for the Er loss features are in good agreement with experimental measurements [2] for temperatures from 230 nK to 2 μK indicating that the entrance channel has long-range repulsive three-body potentials, governed by the asymptotic behavior of the grand-angular-momentum operator and the total orbital angular momentum of the three atoms. [1] K. Bauman, N. Q. Burdick, M. Lu, and B. L. Lev, Phys. Rev. A **89**, 020701 (2014); [2] T. Maier, H. Kadau, M. Schmitt, M. Wezel, I. Ferrier-Barbut, T. Pfau, S. Baier, K. Aikawa, L. Chomaz, M. J. Mark, F. Ferlaino, C. Makrides, E. Tiesinga, A. Petrov, and S. Kotochigova, Phys. Rev. X **5**, 041029 (2015).

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