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The role of vibrational dynamics in resonant positron annihilation on molecules[1] A.C.L. JONES, M.R. NATISIN, J.R. DANIELSON, C.M. SURKO, University of California, San Diego — Vibrational Feshbach resonances (VFRs) are dominant features of positron annihilation for incident positron energies in the range of the molecular vibrations[2]. Recent discovery of a broad spectral component due to multimode VFRs[3] has enabled more accurate investigation of the deviation of resonant amplitudes from the predictions of the VFR model. Studies in relatively small molecules are described that elucidate the role of intramolecular vibrational redistribution (IVR) into near-resonant multimode states, and the subsequent coupling of these modes to the positron continuum, in suppressing or enhancing these resonances. A simple rate model is presented that places limits on the enhancement and suppression of VFRs due to IVR. The implications for annihilation in other molecular species, and the necessary ingredients of a more complete theory of resonant positron annihilation, are discussed.

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[2]G. F. Gribakin, J. A. Young, C. M. Surko, Rev. Mod. Phys. **82**, 2557 (2010).
[3]A. C. L. Jones *et al.*, Phys. Rev. Lett. **108**, 093201 (2012).

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