

Abstract Submitted
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Spectral Resolution of Resonant Positron-Molecule Annihilation due to Multimodes.¹ J. R. DANIELSON, M. R. NATISIN, C. M. SURKO, University of California, San Diego — The annihilation spectra of positrons on molecules, as a function of incident positron energy, are typically dominated by relatively sharp features that have been identified as vibrational Feshbach resonances (VFR) mediated by fundamental vibrations.² The theory of Gribakin and Lee is successful in describing the annihilation spectra for selected small molecules where the annihilation is dominated by a small number of dipole-allowed modes.³ However, in most molecules, these sharp peaks ride on a broad background of enhanced annihilation. There is indirect evidence that this effect is due to a dense set of combination and overtone resonances.⁴ An extension of the Gribakin-Lee theory can be used to describe VFR's due to these multimodes, where the important effect of multiple decay channels is also included. Prospects for resolving these features using a new high-resolution positron beam will be discussed.

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²G. F. Gribakin, J. A. Young, C. M. Surko, *Rev. Mod. Phys.* **82**, 2557 (2010).

³G. F. Gribakin, C. M. R. Lee, *Phys. Rev. Lett.* **97**, 193201 (2006).

⁴A. C. L. Jones, *et al.*, *Phys. Rev. Lett.* **108**, 093201 (2012).

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