

Abstract Submitted
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Role of inelastic escape channels in Feshbach-resonant positron annihilation¹ J.A. YOUNG, University of Nevada, Las Vegas, C.M. SURKO, University of California, San Diego — Energy-resolved positron-molecule annihilation spectra show that positrons can bind to molecules via the vibrational Feshbach resonance (VFR) mechanism [1,2]. Here we take a closer look at VFR in large molecules, paralleling the talk by J. A. Young (this meeting). After normalizing out a weak dependence on binding energy, the magnitudes of C-H stretch mode resonances in large hydrocarbons obey a power-law scaling with the number of vibrational degrees of freedom [3]. The only known outliers are partially fluorinated alkanes. New results are presented for these molecules showing that this behavior can be explained by a strong inelastic channel. For ordinary alkanes, we show that annihilation data taken using 300 K thermal positrons is quantitatively consistent with data taken at higher positron energies. The role played by intramolecular vibrational relaxation (IVR) will also be discussed.

[1] L. D. Barnes, J. A. Young, and C. M. Surko, *Phys. Rev. A* **74**, 012706 (2006).

[2] G. F. Gribakin and C. M. R. Lee, *Phys. Rev. Lett.* **97**, 193201 (2006).

[3] J. A. Young and C. M. Surko, *Phys. Rev. Lett.* **99**, 133201 (2007).

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