Abstract Submitted
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Resonant positron annihilation in the small molecule limit[1] C.M. SURKO, J.A. YOUNG, University of California, San Diego — Energy-resolved measurements of positron-on-molecule annihilation have established the existence of vibrational Feshbach resonances (VFR) in alkanes and other large molecules [1,2]. Large annihilation rates occur whenever the incident positron energy is close to a vibrational mode energy minus the binding energy. Recently, Gribakin and Lee developed a quantitative model which successfully describes this process in halogen substituted methanes [3]. In this paper, we further examine VFR for small molecules. Using a cold positron beam from a Penning-Malmberg trap, we measured the energy resolved annihilation spectra of CD_3Cl, methanol, H_2O, and CO_2 and compared them to the predictions of the model. The presence or absence of resonances in these molecules is also discussed. CD_3Cl is compared to previous measurements of CH_3Cl. Since both should have identical binding, this provides a stringent test of the model.
[1] L. D. Barnes, *et al.*, *Phys. Rev. A* **67**, 032706 (2003).
[2] L. D. Barnes, *et al.*, *Phys. Rev. A* **74**, 012706 (2006).
[3] G. F. Gribakin and C. M. R. Lee, *Phys. Rev. Lett.* **97**, 193201 (2006).

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