Abstract Submitted
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Enhanced resonant positron annihilation due to dipole active non-fundamental vibrational modes[1] SOUMEN GHOSH, JAMES DANIELSON, CLIFF SURKO, University of California San Diego — Positrons can attach to many molecules through Feshbach-resonant excitation of fundamental vibrational modes which leads to greatly enhanced annihilation rates. The shape of the energy resolved annihilation spectra is expected to be determined by the positron beam energy distribution (FWHM $\sim$ 36 meV), which is found to be true for some molecules, including small chain alkanes. Here we present recent data that shows extra spectral features which broaden the resonance for many large ring and chain alkanes. A high-resolution cryogenic beam (FWHM $\sim$ 22 meV) has resolved this feature for cyclopentane, as a sharp, isolated resonance at a location far from any known fundamental vibrational mode. Details of this new resonant feature will be presented and results will be compared with the infra-red absorption spectra. Implications for other molecular targets will be discussed.

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