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From trapped hydrogen to trapped antihydrogen spectroscopy

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The Doppler-free 1S-2S spectroscopy (see Fig.1) of trapped hydrogen at 400 μ K in a quasi-harmonic trap confirms the necessary momenta exchange between the laser beam transverse profile and the atoms as the basis for a time-of-flight lineshape^{1,2,3}. At a much higher temperature, laser intensity and bias magnetic field of 1 T and non-harmonic trap, the antihydrogen spectral lineshape (see Fig.2) shows similar but different features⁴ complicated by the AC Stark shift. I will discuss these topics and preparation for a cryogenic hydrogen beam spectroscopy at UFRJ.

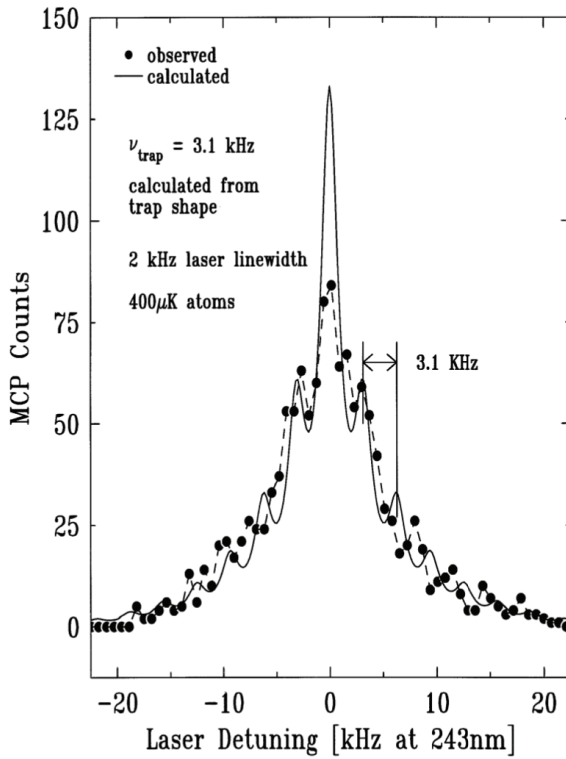


Figure 1: Doppler-Free 1S-2S spectra in Hydrogen^{1,3}

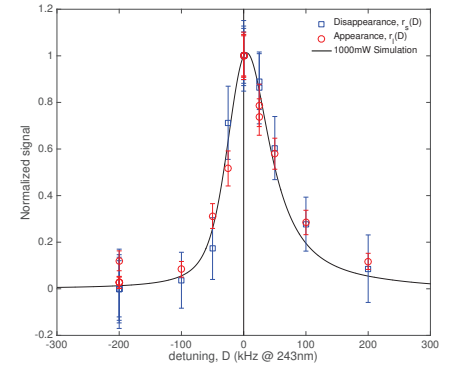


Figure 2: Doppler-Free 1S-2S spectrum in Antihydrogen⁴.

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