

**High resolution XUV laser spectroscopy of HD and D<sub>2</sub>**

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Using a narrowband ( $\sim 0.01 \text{ cm}^{-1}$ ) and tunable extreme ultraviolet (XUV) laser source, spectral lines in the Lyman and Werner bands of the HD and D<sub>2</sub> hydrogen isotopomers were re-investigated in high resolution. The XUV transitions were monitored via a 1 XUV + 1 UV multiphoton ionization and detection of ions after time-of-flight mass separation. The narrowband XUV radiation was obtained through third harmonic generation of the frequency-doubled output of a pulsed dye amplifier, seeded by a CW ring dye laser. The goals of these measurements are twofold. Firstly, a comparison is made to test the *ab-initio* calculations on the B<sup>1</sup> $\Sigma_u^+$  - X<sup>1</sup> $\Sigma_g^+$  and C<sup>1</sup> $\Pi_u$  - X<sup>1</sup> $\Sigma_g^+$  systems of HD and D<sub>2</sub>. Secondly, the present high-resolution results serve to calibrate the emission spectra of the Lyman and Werner bands with the 10 m classical spectrometer present in the Observatoire de Paris, Meudon.