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H₂⁺ spectroscopy - status and perspectives

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Ro-vibrational spectroscopy of the hydrogen molecular ions H₂⁺ and HD⁺ is a promising path for fundamental constants metrology. It could improve the current knowledge of the proton-to-electron mass ratio and contribute to resolving the current discrepancy on the proton charge radius and/or Rydberg constant. Very precise predictions of the transition frequencies, taking high-order QED corrections into account, are required for these objectives. The theoretical accuracy has been improved by several order of magnitude in recent years, reaching the 10⁻¹² range [1]. I will describe the calculation of vacuum polarization contributions involving the Uehling potential [2]. The status of our experiment for two-photon spectroscopy of H₂⁺ will also be presented.

[1] V.I. Korobov, L. Hilico, and J.-Ph. Karr, Phys. Rev. Lett. 112, 103003 and Phys. Rev. A 89, 032511 (2014).

[2] J.-Ph. Karr, L. Hilico, and V.I. Korobov, Phys. Rev. A 90, 062516 (2014).

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