

Nonadiabatic Relativistic and QED Correction to the Dissociation Energy of the Hydrogen Molecule Isotopologues

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Theoretical studies of hydrogen molecule is the cornerstone of ultraprecise quantum chemistry. Due to its simplicity, the achieved precision is the highest among all molecules and still has a potential of significant enhancement. Moreover, there are many narrow transitions between rotational and vibrational levels in hydrogen molecules which can, in principle, be measured very accurately what opens new perspectives for determination of fundamental physical constants from its spectra. We search for discrepancies between highly accurate spectroscopic measurements [1,2,3,4] and theoretical predictions based on QED, in order to discover new effects or even new interactions which might result in the development of the Standard Model. We will present the latest advances in calculation reaching the subMHz level for the dissociation energy of molecular hydrogen isotopologues. [5,6,7]

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