

PROJECT: *Relativistic and finite nuclear mass effects in the magnetic properties of hydrogen molecules*

Our research work on the hydrogen molecule aims at obtaining theoretical predictions of basic magnetic properties with an accuracy comparable to that of the existing experimental data and to keep up with advances in modern spectroscopic measurements. It is to give a deeper comprehension of the primary role of magnetic interaction in molecular structure, understood also as changes caused by the interaction with an external magnetic field. The possibility of using the most fundamental theoretical basis and the high precision computational methods allows getting results, that would set the new standards of accuracy and would be used as a reference for the calculations for more complex systems. Furthermore, a comparison between the current experimental data and calculations may lead to the use of the hydrogen molecule for non-trivial applications, e.g. to establish an absolute shielding scale in nuclear magnetic resonance spectroscopy, determine nuclear magnetic moments, or fixing the constraints on anomalous spin-dependent forces, which would broaden our knowledge about fundamental interactions.