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## Molecular hydrogen as probe for new physics

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Molecular hydrogen has been identified as a search ground for physics beyond the Standard Model. This is complementary to searches motivated by high-energy and astroparticle physics, as we search for subtle effects at the low-energy scale in the spectra of simple molecules. The quantum level structure of the hydrogen molecule can now be calculated to very high precision. These theoretical results are confronted with highly accurate measurements using advanced laser-based techniques, and the comparison used as probe for new effects. The Angstrom internuclear distances in the hydrogen molecule lead to an enhanced sensitivity for possible fifth forces at the Angstrom length scale [1]. Such interactions could also be associated with new particles in the keV mass range, which may be potential dark matter candidates. The comparison could also be interpreted as a search for extra spatial dimensions, since if the compactification volume of the latter is comparable to the molecular size the resulting enhancements in gravitational effects may lead to measurable energy shifts [2].

[1] E.J. Salumbides, J.C.J. Koelemeij, J. Komasa, K. Pachucki, K.S.E. Eikema, W. Ubachs, *Phys. Rev. D* 87, 112008 (2013).

[2] E.J. Salumbides, A.N. Schellekens, B. Gato-Rivera, W. Ubachs, *New. J. Phys.* 17, 033015 (2015).

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