The spectrum of molecular hydrogen can be measured in the laboratory to very high precision using advanced laser and molecular beam techniques, as well as frequency-comb based calibration [1,2]. The quantum level structure of this smallest neutral molecule can now be calculated to very high precision, based on a very accurate ($10^{-15}$) precision Born-Oppenheimer potential [3] and including subtle non-adiabatic, relativistic and quantum electrodynamic effects [4]. Comparison between theory and experiment yields a test of QED, and in fact of the Standard Model of Physics, since the weak, strong and gravitational forces have a negligible effect. Even fifth forces beyond the Standard Model can be searched for [5]. Astronomical observation of molecular hydrogen spectra, using the largest telescopes on Earth and in space, may reveal possible variations of fundamental constants on a cosmological time scale [6]. A study has been performed at a 'look-back' time of 12.5 billion years [7]. In addition the possible dependence of a fundamental constant on a gravitational field has been investigated from observation of molecular hydrogen in the photospheres of white dwarfs [8]. The latter involves a test of the Einstein's equivalence principle.