

Pionic hydrogen and deuterium

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The ground-state level shifts and broadenings of the hydrogen isotopes caused by the strong interaction have been determined by using a high-resolution crystal spectrometer. From these parameters are derived the pion-nucleon and pion-deuteron scattering lengths and the threshold production and absorption strength of pions in nucleon-nucleon reactions. Muonic hydrogen reveals properties in the de-excitation cascade of such electrically neutral exotic atoms, the understanding of which is essential for analysis of the data. Experimental results are discussed in the context of recent theoretical efforts within the approach of chiral perturbation theory and atomic cascade calculations.

*for the PIONIC HYDROGEN collaboration

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