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Evidence for Efimov quantum states in an ultracold gas of cesium atoms B. ENGESER, T. KRAEMER, M. MARK, P. WALDBURGER, J.G. DANZL, C. CHIN, A.D. LANGE, K. PILCH, A. JAAKKOLA, H.-C. NÄGERL, R. GRIMM, Institut für Experimentalphysik, Universität Innsbruck — A landmark theoretical advance in few-body quantum physics is Efimov's prediction of weakly bound three-body states occuring close to a two-body scattering resonance. Among the amazing properties predicted for Efimov states is the existence of weakly bound trimer states even when the interaction does not support a weakly bound dimer state. Since the Efimov problem originally occured 35 years ago in the context of nuclear matter, it has attracted great interest in many different areas of physics. In my talk I will report on the observation of an "Efimov resonance" as a clear manifestation of an Efimov state. The resonance arises in the zero collision energy limit from the coupling of three free atoms to an Efimov trimer and shows up as a giant three-body loss feature when the two-body interaction is magnetically tuned near a Feshbach resonance. Our results confirm central theoretical predictions of Efimov physics and represent a starting point to explore the universal properties of resonantly interacting few-body systems.

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