Abstract Submitted
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Theoretical and Experimental evidence for the observation of trilobite states in Cs JONATHAN TALLANT, DONALD BOOTH, JAMES SHAFFER, University of Oklahoma, SETH RITTENHOUSE, HOSSEIN SADEGHPOUR, ITAMP, Harvard-Smithsonian Center for Astrophysics — A novel binding mechanism arises from the attractive, low-energy scattering of a Rydberg electron from a neighboring ground state atom. The states formed by this binding mechanism are referred to as trilobite or trilobite-like states. A primary difference between the trilobite and trilobite-like states is the angular momentum of the Rydberg atom, which is dominated by an s-wave Rydberg orbit. The larger angular momentum of trilobite states can change the properties of the molecules that form. For example, large l trilobite molecules are predicted to have giant, body-fixed permanent dipole moments ($\sim$ 1kD). Trilobite-like states were observed in 2009 in Rb [1]. We present experimental evidence for trilobite molecules formed as a result of state mixing between the nS and $(n-4) \geq F$ states in Cs, due to the small non-integer quantum defects in the Cs s state, and compare the observation with theoretical results.

[1] V. Bendkowsky et al. Nature 458, 1005 (2009)

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