



SFB/TRR 21 - Seminar

22. Januar 2015, Stuttgart

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Cs Trilobite and Butterfly Molecules

We present results on Cs ultracold Rydberg atom experiments involving trilobite and butterfly molecules. Trilobite molecules are predicted to have giant, body-fixed permanent dipole moments, on the order of 1000 Debye. We present spectra for $nS_{1/2} + 6S_{1/2} \ ^3\Sigma^+$ molecules, where $n = 37, 39$ and 40 , and measurements of the Stark broadenings of selected trilobite states in Cs due to the application of a constant external electric field. These results show that for Cs, because of its near integer s-state quantum defect, it is possible to photoassociate molecules whose wavefunction is predominantly of trilobite character yielding molecular frame dipole moments of around 2000 Debye. In addition, we have also recently observed states whose spectra show characteristics of p-wave dominated butterfly states. The work on what we believe to be the butterfly states will be compared and contrasted to the measurements of the trilobite states.

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