

Observation of 'missing' levels in the long-range potential of ultracold Cs dimers

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In this talk I will describe the experimental work we have done with our ultracold cesium-potassium mixture apparatus [1, 2] that led to the observation of two 'missing', lowest-lying vibrational levels in the outer-well of the $0_g^-(6S_{1/2} + 6P_{3/2})$ molecular potential of cesium dimers. According to theoretical predictions of Bouloufa et al. [3], the introduction of these levels is necessary to provide a numerical form of the molecular potential curve that would explain existing experimental data available for the states located in this long-range well. The measurements provide an unambiguous confirmation of theoretical predictions, concluding several unsuccessful attempts made by other research groups. With this work, a proof is provided that a previous study that claimed the discovery of these 'missing' levels [4] in reality reported levels belonging to another molecular potential.

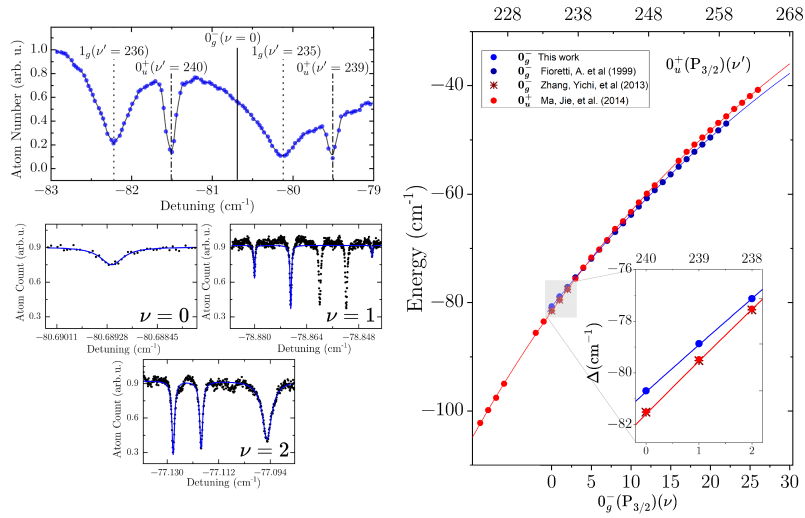


Figure 1: (left) Photoassociation spectra of the 'missing' levels in the $0_g^-(6S_{1/2} + 6P_{3/2})$ molecular potential. (right) Comparison of the obtained results with previous state of the art spectroscopy of cesium dimers.

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