

Abstract Submitted  
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**High intensity photoassociation spectroscopy of ultracold strontium atoms: nonperturbative theoretical analysis** PHILIPPE PELLEGRINI, ROBIN CÔTÉ, University of Connecticut, Physics Department, U-3046 Hillside Road, Storrs CT, 02269-3046, TOM KILLIAN, Department of Physics and Astronomy, Rice University, Houston, TX 77251 — High precision spectroscopy of excited molecular states at very large internuclear distance can be realized by a photoassociation process in which two colliding ultracold atoms in their ground state absorb a photon from a laser field in resonance with an excited ro-vibrational bound molecular level. The theoretical analysis of experimental spectra is usually based on a perturbative approach only valid in the low intensity regime. Due to very favorable transition dipole moments in strontium, the saturated regime occurs with laser intensities which can be easily reached experimentally. We will present a nonperturbative analysis of photoassociation spectra at high intensities. New features in the photoassociation lineshapes will be presented and the role of the last bound level of the ground molecular potential will be discussed.

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