

Abstract Submitted
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Weakly bound molecules. Analysis by the Lu-Fano method coupled to the LeRoy-Bernstein model. LAURENCE PRUVOST, HAIKEL JELASSI, BRUNO VIARIS DE LESEGNO, lab Aimé Cotton, cnrs Orsay, LAC TEAM — We have realized the photo-associative spectroscopy of cold 87Rb atoms, below the $(5s1/2+5p1/2)$ dissociation limit. Recorded spectra exhibit 3 molecular vibrational series : 0g-, 0u+ and 1g. Such weakly bound molecules (WBM) are described by the dipole-dipole interaction ($1/R^3$ or as $1/R^6$). WBM energies are described by the Le Roy-Bernstein (LRB) model. The discrepancies to LRB law are due to the short distance behaviour of molecular potentials or to couplings between molecular series due to interactions such as spin-orbit or spin-spin interactions. To analyse the data, we have adapted the Lu-Fano (LF) method - well-known for Rydberg atoms - to WBM. Using the LRB law, a molecular quantum defect is defined and plotted versus the energy. The obtained LF graph allows us to characterise the molecular potential and the interactions. The 0g- LF graph is a linear, signature of the short range behaviour of the molecular potential. A model connects the slope to short range behaviour [1]. The 0u+ LF graph exhibits sharp variations, signatures of a coupling with a neighbouring series. A two series model allows us to evaluate the coupling, identify two perturbing levels of the $(5s1/2+5p3/2)$ 0u+ series and do predictions about its first pre-dissociated level [2]. [1] H. Jelassi, B.Viaris De Lesegno, L. Pruvost, Phys. Rev. A. 73, 32501 (2006) [2] H. Jelassi, B.Viaris De Lesegno, L. Pruvost, Phys. Rev. A. 74, 12510 (2006)

Laurence Pruvost
lab Aimé Cotton, cnrs Orsay

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