DETERMINATION OF THE $0^+_g$ PURE LONG RANGE POTENTIAL CURVE OF Rb$_2$ AND Cs$_2$; APPLICATION TO ULTRACOLD MOLECULES FORMATION

R. F. GUTTERRES, C. AMIOT, O. DULIEU and F. MASNOU-SEEUWS, Laboratoire Aimé Cotton, Bât 505, Campus d’Orsay 91405, Orsay Cedex, France.

This work presents an accurate study of the $0^+_g (P_{3/2})$ pure long range electronic state of the $^{87}$Rb(5S)-$^{87}$Rb(5P$_{3/2}$) and $^{133}$Cs(6S)-$^{133}$Cs(6P$_{3/2}$) molecular systems. Generalized simulated annealing method was used in order to reduce the high resolution spectral data provided by photoassociative spectroscopy of ultra cold $^{87}$Rb and $^{133}$Cs atoms. The analysis has allowed the determination of the effective dispersion parameters, the chemical exchange energy contribution as well as the dissociation energy concerning the analytical potential representation of the $0^+_g (P_{3/2})$ state for both, Rb$_2$ and Cs$_2$, molecules. A detailed comparison with the potential curves obtained through RKR procedure is performed, and the consequences for ultracold molecules formation rates are discussed.