THE $4^3\Delta_g$ STATE IN K_2 - INVESTIGATING A POSSIBLE GATEWAY TO CORE NON-PENETRATING RYDBERG STATES

JENNY M. MAGNES, *Department of Physics, United States Military Academy, West Point, New York 10996, USA*; A. MARJATTA LYYRA, ERGIN AHMED, *Department of Physics, Temple University, Philadelphia, PA 19122*; YAOMING LIU, *Department of Chemistry, University of Illinois at Chicago, Chicago, IL 60607*; LI LI, *Tsinghua University,Key Lab Atom and Molecular Nanoscience, Beijing 100084, Peoples Republic of China*; SYLVIE MAGNIER, *I.U.M.F. de Bretagne, 153 Rue Saint Malo, CS 54310 F-35042 Rennes Cedex, France, and, Laboratoire de Physique des Atomes, Lasers, Molécules et Surfaces (PALMES), CNRS et Université Rennes I (UMR6627), Campus de Beaulieu, Bât. 11B, F-35043 Rennes Cedex, France*; MONIQUE FRÉCON, *Laboratoire de Spectrométrie Ionique et Moleculaire (L.A.S.I.M), CNRS et Université Lyon (UMR5579), Campus de la Doua, Bât. Alfred Kastler, 43 Bd du 11 Novembre, F-69622 Villeurbanne Cedex, France*.

Core non-penetrating Rydberg states can give useful information on the electronic structure of the ion core; however, core non-penetrating states are difficult to observe since these states hardly penetrate the more accessible ion core and the electronic angular momentum quantum number, l, is large, for the core non-penetrating states thus the transition dipole moment to the core non-penetrating states is small. The core penetrating $4^3\Delta_g$ state (atomic limit: 4s+5d) and the core non-penetrating $3^3\Delta_g$ state (atomic limit: 4s+4f) perturb each other since they have the same symmetry and overlapping energy states thus creating the possibility of a gateway to other core non-penetrating states.