

Abstract Submitted  
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**A study of long-range covalent–ion-pair coupling in Rb<sub>2</sub> and a comparison with Li<sub>2</sub>** JEFFREY PHILIPPSON, ROBERT COLLISTER, RALPH SHIELL, Trent University — The formation of bound ion-pair states through optical excitation at short-range has been observed in a number of alkali dimers, while the corresponding process due to collisions following excitation at long-range has thus far only been observed between alkali atoms and large molecules of exceptionally high electron affinity [1]. A study of long-range covalent–ion-pair coupling in cold Rb<sub>2</sub> and Li<sub>2</sub> is presented, including the dependence of this long-range process on parameters such as the initial relative velocity and impact parameter for two different mechanisms [2]. Calculations are based on the well-known Landau–Zener formalism and particular attention has been paid to the regions of parameter space in which the approximations implicit in this approach remain valid. Cross-sections for ion-pair formation are calculated for different channels of the ground- and excited-state atom pair in order to identify possible “gateway” states for efficient experimental production of bound ion-pair systems.

- [1] M. Cannon and F.B. Dunning, *J. Chem. Phys.* **130** 044304 (2009)  
[2] M. Cheret and L. Barbier, *Phys. Rev. A* **30** 1132 (1984).

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