

Abstract Submitted
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Prospects for photoassociation of alkaline-earth-alkali-metal neutral and ionic molecules OLIVIER DULIEU, Laboratoire Aime Cotton, CNRS, Orsay, France, MIREILLE AYMAR, NADIA BOULOUDA, Laboratoire Aime Cotton, CNRS, Orsay, France, ROMAIN GUEROUT, Laboratoire Kastler-Brossel, CNRS, ENS, Univ Pierre et Marie Curie, Paris, France — In this work, we investigate the previously unknown electronic structure and properties of ionic and neutral diatomic molecules which could be formed from cold Strontium ions or atoms and ultracold alkali atoms A ($A=\text{Li, Na, K, Rb, Cs}$). The ionic and neutral species can be modeled as effective two- and three-valence electron systems respectively, in the field of polarizable ionic cores Sr^+ and A^+ . Using a standard quantum chemistry approach based on pseudopotentials for atomic core representation, Gaussian basis sets, effective core polarization potentials, and full configuration interaction (FCI) we calculate potential curves, permanent and transition dipole moments, and static dipole polarizabilities for several molecular states of various symmetries as functions of the internuclear distance. The possibilities for radiative charge exchange, photoassociation, and formation of cold molecular ions, and photoassociation and formation of cold neutral molecules, are discussed, as well as the collisional stability of the molecular species in the presence of remaining atoms.

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