

***Ab Initio* Study of the Ground and First Excited Electronic States of the
Strontium Dimer**

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Recently we have successfully applied the relativistic *ab initio* valence bond method to calculate $\hbar\omega$ -dependent ground state potentials and C_6 coefficients of Cs_2 and Rb_2 which compare well to other data. Now this approach is used to obtain electronic potential surfaces of Sr_2 . Interest in these potentials is fueled by experiments on ultra-cold strontium atoms. The scattering properties of interaction potentials will determine whether Bose-Einstein condensate can be obtained. Some spectroscopic data on the ground $X^1 \Sigma_g^+$ potential is available and used to compare to our valence bond results. Long range dispersion coefficients C_6 and C_8 are evaluated from the theoretical potentials.