

Abstract Submitted
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Calculations of long-range three-body interactions for $\text{Li}(2^2S)\text{-Li}(2^2P)\text{-Li}^+(1^1S)$ ¹ PEI-GEN YAN, U. New Brunswick, LI-YAN TANG, WIPM, ZONG-CHAO YAN, U. New Brunswick WIPM, JAMES F BABB, ITAMP, Harvard-Smithsonian CfA — We theoretically investigate long-range interactions for a three-body system involving a ground state Li atom, an excited P state Li atom and a ground state Li ion, denoted by $\text{Li}(2^2S)\text{-Li}(2^2P)\text{-Li}^+(1^1S)$, with highly accurate variationally-generated nonrelativistic wave functions in Hylleraas coordinates. Using degenerate perturbation theory for the energies up to second-order, we evaluate the coefficients C_3 of the first-order induced and dipolar interactions, the coefficients C_4 , C_6 and C_8 of the second-order additive interactions and the coefficients C_5 and C_7 of the second-order nonadditive interactions. Specific values of these coefficients will be given for different configurations of the three nuclei. The calculations are given for three like-nuclei for the cases of hypothetical infinite mass Li nuclei, and of real finite mass ^6Li or ^7Li nuclei. The results may be useful in the study of ultra-cold plasma.

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