APS move to poster. Abstract Submitted

for the DAMOP16 Meeting of
The American Physical Society

Long–Range Atom–Wall Mixing Terms for Excited States[1] ULRICH D. JENTSCHURA, Missouri Univ of Sci & Tech — Long-range interactions between an atom and a perfectly conducting surface have been studied for a number of decades. Based on the work of G. Barton [J. Phys. B 7 (1974) 2134], we know that the treatment of these interactions for excited reference states can be highly problematic, requires the careful regularization of infinities, and additional renormalizations. Here, the treatment is extended to higher-order corrections, namely, mixing terms which are generated by the spatial symmetry breaking due to the presence of the conducting surface. These terms are evaluated, with full account of retardation, for metastable hydrogen [see Phys. Rev. A 91 (2015) 010502(R)]. Very-long-range admixture "tails" due to neighboring $2P_{3/2}$ states which are removed from the reference $2S$ state only by the fine structure, have a characteristic and surprising oscillatory $1/Z$ form in the vicinity of a surface, where Z is the atom-surface distance. The transition from the long-range regime to the nonretarded close-range interactions and admixture terms is studied.

[1]Supported by the NSF (Grant PHY–1403973)

Ulrich D. Jentschura
Missouri Univ of Sci & Tech

Date submitted: 31 Mar 2016 Electronic form version 1.4