

Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Complex q parameters for helium $L = 0, 1, 2$ autoionizing levels¹

N.L.S. MARTIN, B.A. DEHARAK, University of Kentucky, K. BARTSCHAT, Drake University — We recently reported² out-of-plane experiments on He autoionization. The data were presented as angular distributions of ejected electrons from the three autoionizing levels 1S_0 , 1D_2 , and 1P_1 and exhibited two well known features, the binary and recoil peaks. It was found that the recoil peak (relative to the binary peak) could be accurately reproduced by a second order distorted wave Born calculation using the R -matrix with pseudo-states approach, but not by the equivalent *first order* calculation, which underestimated the size of the recoil peak. It was also found that a plane wave Born approximation calculation could reproduce the results, but only if anomalously large values of Fano q -parameters were assumed. We will present an analysis of the first and second order calculations in terms of Fano q parameters. We find that for the first order calculations the q parameters are essentially real, but for the second order calculations they are complex quantities. The 1D_2 parameters are particularly striking in this respect.

¹This work was supported by the National Science Foundation under Grants No. PHY-0555541 (NLSM) and PHY-0244470 (KB).

²B.A. deHarak, K. Bartschat, and N.L.S. Martin, *Phys. Rev. Lett.*, **100**, 063201 (2008).

N. L. S. Martin
University of Kentucky

Date submitted: 27 Jan 2009

Electronic form version 1.4