

Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Electron elastic scattering off high spin atoms: the Cr and Mn case¹ V. DOLMATOV, University of North Alabama, M. AMUSIA, Hebrew University, Israel & Ioffe Physical Technical-Institute, St. Petersburg, Russia, L. CHERNYSHEVA, Ioffe Physical Technical-Institute, St. Petersburg, Russia — The Cr(... $3d^54s^1$, 7S) and Mn(... $3d^54s^2$, 6S) atoms belong to the cohort of high spin atoms, owing to their semifilled $3d^5$ and $4s^1$ (in Cr) subshells. The current understanding of low-energy electron scattering off such atoms is rudimentary. Here, we scrutinize the impacts of electron correlation, exchange, and electron spin-polarization on elastic scattering phase shifts and total cross sections of $e^- + \text{Cr}$ and $e^- + \text{Mn}$ scattering, as well as Wigner time delays of the scattering processes in question, in the electron energy interval where most interesting effects occur, $E = 0\text{--}15$ eV. We also provide an update to our earlier calculated results for $e^- + \text{Mn}$ scattering [1]. The findings of this work identify some of the most intrinsic properties of electron elastic scattering off semifilled shell atoms. As in [1], a “spin-polarized” Hartree-Fock approximation, random phase approximation with exchange, and the Dyson theory for the self-energy part of the Green function of a scattered electron have been blended in together in order to advance into the understanding of electron scattering off semifilled shell atoms.

[1] V. K. Dolmatov, M. Ya. Amusia, and L. V. Chernysheva, Phys. Rev. A **88** 042706 (2013).

¹Supported by the NSF grant PHY-1305085.

V. Dolmatov
University of North Alabama

Date submitted: 29 Jan 2014

Electronic form version 1.4