Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Quadrupole $nd \to nl$ resonances in valence ns-photoelectron angular distributions from half-filled shell atoms.[1] VALERIY DOLMATOV, University of North Alabama — Nondipole photoelectron angular distributions from atoms have become an *ad hoc* topic of intensive research in recent years. To date, such distributions have largely remained unstudied, with a few exceptions, in open-shell atoms in view of difficulties in handling such atoms. Therefore, we have unfolded a theoretical program focusing on studies of nondipole photoelectron angular distributions from open-shell atoms. In the present work, we choose the Mn($3d^5 4s^2$, ^{6}S) atom as a case study owing to its relative "simplicity" because its open $3d^5$ subshell is only half-filled. We explore features of nondipole angular asymmetries for valence 4s-photoelectrons in a region of $3d \to nl(l = 0, 2, 4)$ quadrupole resonances. A removal of a 4s electron leaves the Mn atom either in a $3d^5 4s$,(^{7}S) or $3d^5 4s$,(^{5}S) final state. It is found that, due to demonstrated exclusive for a half-filled shell atom electron correlation effects, resonance enhancements of 4s nondipole angular asymmetry parameters depend markedly on final state terms of the atom, both in their magnitudes and shapes, with one of them overshooting the other by almost an order of magnitude at the resonance maximum, and with both of them far overshooting the dipole approximation value of 2. A "spin-polarized" RPAE has been employed in this study.

[1]The NSF financial support PHY-0456480 is acknowledged.

Valeriy Dolmatov
University of North Alabama

Date submitted: 30 Nov 2005 Electronic form version 1.4