

Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Refutation of a propensity rule in low-energy electron scattering by neon atoms LEIGH HARGREAVES, COLIN CAMPBELL, MURTADHA A. KHAKOO, California State University Fullerton, OLEG ZATSARINNY, KLAUS BARTSCHAT, Drake University — Since the work of Kohmoto and Fano [1] there has been considerable interest in the sign of the ‘orientation’ parameter L_{perp} , which describes the angular momentum of an excited electronic state perpendicular to the scattering plane imparted by the projectile electron. In a polarization-correlation experiment, L_{perp} can be related to the measurable Stokes parameter P_3 ($L_{\text{perp}} = -P_3$), which describes the circular polarization of the photon emitted perpendicular to the scattering plane. Of particular interest is the empirical observation that, for S to P transitions, P_3 universally trends to negative values for small scattering angles, regardless of the target or incident energy. A number of studies (e.g. [1-3]) have therefore considered the generality of this ‘propensity rule’ and its theoretical basis. Here, a recent joint experimental and theoretical study of electronic excitation of the resonant transition in neon by 25eV electrons is presented. In both the theoretical and experimental data it is observed that P_3 is positive at small scattering angles, demonstrating a refutation of this propensity rule, in disagreement with the classical arguments of Kohmoto and Fano [1].

- [1] M. Kohmoto and U. Fano, J. Phys. B **14**, L447 (1981)
- [2] D. H. Madison and K. H. Winters, Phys. Rev. Lett. **47**, 1885 (1981)
- [3] K. Bartschat, N. Andersen and D. Loveall, Phys. Rev. Lett. **83**, 5254 (1999)

Murtadha A. Khakoo
California State University Fullerton

Date submitted: 30 Jan 2012

Electronic form version 1.4