

Abstract Submitted  
for the CAL11 Meeting of  
The American Physical Society

**Physics in Screening Environments** ONDREJ CERTIK, PETER WINKLER, University of Nevada, Reno NV 89557 — The calculation of electronic states of atoms in screening environments, e.g. plasmas, is often performed using Debye's approach which replaces the frequency independent part of screening by a simple, distance dependent function. Only later has this approach been extended to include also screened electron-electron interactions. This generalization faces the difficulty that for the Debye interaction an expansion as simple as the one for the Coulomb interaction, the  $r^k/r^{k+1}$  - rule, has not been known. In the present work a method has been developed that allows for the analytic calculation of the screened electron-electron interaction matrix elements. This method has been applied to small atoms and quantum dots. For larger systems such as clusters, numerical methods of calculation are preferable and being developed. Of particular interest are the scattering resonances of atoms and ions in screening systems because they give direct experimental evidence of the degree of screening.

Peter Winkler  
University of Nevada, Reno NV 89557

Date submitted: 29 Sep 2011

Electronic form version 1.4