Abstract Submitted for the DPP05 Meeting of The American Physical Society

Correlation Effects and their Impact on Line Broadening in Plasmas: Application to H_{α} EVGENY STAMBULCHIK, DIMITRI FISHER, YITZHAK MARON, Weizmann Institute of Science, Israel, HANS R. GRIEM, University of Maryland, USA, SPIROS ALEXIOU, University of Athens, Greece — In the last two decades, several computational approaches to the Stark broadening in plasma have been developed, where motion of both ions and electrons is simulated and their fields are calculated using an effective Debye-Yukawa potential. Such an approximation, in general, can be questioned in cases when the number of plasma particles in the Debye sphere is about unity or below. For testing the applicability of this approach, large-scale molecular-dynamics simulations were performed, with all plasma particles interacting by the Coulomb potential, and the correlations in the motion of the particles were analyzed. It was found that even for a moderately coupled plasma ($n_e = 10^{18}$ cm⁻³, T = 1 eV), the collective effects play a major role in the statistical and dynamical properties of the micro-fields. Nevertheless, the corrections to the H_{α} profile are rather minor, for which an explanation is presented.

> Evgeny Stambulchik Weizmann Institute of Science, Israel

Date submitted: 24 Jul 2005

Electronic form version 1.4