

Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

Analysis of spectral line shapes in HID plasmas¹ HARTMUT SCHNEIDENBACH, STEFFEN FRANKE, MARTIN WENDT, MARGARITA BAEVA, INP Greifswald, Felix-Hausdorff-Str. 2, D-17489 Greifswald, Germany — The optical emission spectroscopy is widely used for the temperature determination in high-intensity discharge plasmas. The spectral lines are in general strongly reabsorbed around the line centre at high pressures. The plasma parameters can be determined by fitting the measured spectral radiances with radiation transport calculations where the knowledge of the line profile and broadening mechanisms is required. For sufficiently strong reabsorption spectral lines become self-reversed. Bartels and Karabourniotis developed methods which make use of the special features of the spectral radiance at the reversal maxima. The plasma layer properties are approximately represented by an inhomogeneity parameter. The application of these approximations for fitting measured spectral radiances is proposed. High-pressure mercury discharges without and with metal halide additives have been analyzed. The different methods for the temperature determination have been compared and their applicability has been discussed for different spectral lines.

¹This work was partly supported by the German Federal Ministry for Education and Research (BMBF, FKZ 13N8604).

Hartmut Schneidenbach
INP Greifswald, Felix-Hausdorff-Str. 2, D-17489 Greifswald, Germany

Date submitted: 12 Jun 2008

Electronic form version 1.4