Abstract Submitted
for the GEC09 Meeting of
The American Physical Society

Optical absorption spectroscopy with an UHP-lightsource – an effective diagnostic method for Dy- and Ce-emitters in high intensity discharge lamps[1] MICHAEL WESTERMEIER, CORNELIA RUHRMANN, JENS REINELT, PETER AWAKOWICZ, JUERGEN MENTEL, Ruhr-University Bochum, Germany — The so called "emitter effect" of elements like dysprosium and cerium is used to lower the work function and thereby the temperature of tungsten electrodes in HID lamps. A special setup for absorption spectroscopy was developed to measure the density of particles within the lamp plasma consisting mainly of a backlight realized by a powerful ultra high pressure (UHP) lamp and a 1D-imaging spectrograph. It allows a direct measurement of the absorption profiles of Dy (λ= 625.91 nm) and Ce (λ= 577.36 nm) resonance lines within the lamp plasma. From these the ground-state atom density of Dy or Ce can be determined independently of the plasma temperature. Phase resolved measurements of the Dy-density and corresponding electrode temperatures in a ceramic HID lamp will be presented for low and high frequency operation. The results will be compared with measurements at lamps doped with Ce given in an accompanying poster and interpreted by the emitter effect.

[1]Supported by Philips Lighting NL, the DFG (GK 1051) and the RUB Research School.

Michael Westermeier
Ruhr-University Bochum, Germany

Date submitted: 10 Jun 2009 Electronic form version 1.4