

The First Measured Stark Width and Shift of the 402.6186 nm He I Line

Stevan Djeniže, Aleksandar Srećković, and Srdjan Bukvić

Faculty of Physics, University of Belgrade, P. O. Box 368, 11001 Belgrade, Serbia

Reprint requests to Prof. S. D.; E-mail: steva@ff.bg.ac.yu

Z. Naturforsch. **60a**, 282 – 284 (2005); received December 20, 2004

Stark width (W) and shift (d) of the neutral helium (He I) 402.6186 nm spectral line in the high lying 2p–5d transition have been measured in the optically thin helium plasma created in a linear, low-pressure, pulsed arc discharge at a 52,000 K electron temperature and $1.3 \cdot 10^{23} \text{ m}^{-3}$ electron density. Obtained data are the first experimental values of the Stark width and shift related to the mentioned He I spectral line. Direct comparison with theoretical results is not possible due to the fact that available data are calculated for considerably lower electron densities. We found that at 10^{23} m^{-3} electron density the lowering of the effective ionization energy has influence on the number and contribution of the perturbing energy levels, especially in the case of the high lying parent energy level of the particular transition. This effect generates lower Stark widths in the high lying He I transitions than the existing theoretical approximations provide. We have found negative Stark shift.

Key words: Plasma Spectroscopy; Line Profiles; Atomic Data.