

THE METHOD FOR MAPPING ELECTRIC FIELD DISTRIBUTION IN CATHODE FALL REGION OF AN ABNORMAL GLOW DISCHARGE USING NEUTRAL NEON SPECTRAL LINE SHAPES

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The line shapes of several weak and very weak Ar I and Ne I spectral line in spectral range from 500 nm to 550 nm have been recently studied in an abnormal glow discharge of Grimm type (Majstorović *et al.* 2013, Šišović *et al.* 2014). Spectral lines were observed along the axis of a cylindrical glow discharge parallel (side-on) and perpendicular (end-on) to the cathode surface. The end-on recorded line profiles showed not only up to 30negative glow, but also wavy features at the far wings. The phenomena observed in end-on line shapes in Grimm type glow discharge are related quantitatively to dc Stark effect in the cathode fall region and plasma line broadening in negative glow region. Namely, the side-on spectra showed spectral line shifting and sometimes simultaneous shifting and splitting in the cathode fall region of the glow discharge. The results of the measured line shift with available data for the dc Stark effect may be used for estimate electric field strength in the cathode fall region of the glow discharge. The method for mapping electric field distribution in cathode fall region of an abnormal glow discharge will be demonstrated using profiles of spectral line Ne I 534.109 nm.

References

- Majstorović, G. Lj., Ivanović, N. V., Šišović, N. M., Djurović, S, Konjević, N.: 2013, *Plasma Sources Sci. Technol.* 22, 045015.
Šišović, N. M., Ivanović, N. V., Majstorović, G. Lj., Konjević, N.: 2014, *J. Anal. At. Spectrom.* 29, 2058-2063.