

MATHEMATICAL  
MODELING OF PLASMA IN A GLOW  
DISCHARGE OF SPHERICAL GEOMETRY

*V.A. Zhovtyansky, Yu.I. Lelyukh*

Institute of Gas, Nat. Acad. Sci. of Ukraine  
(39, Degtyarivs'ka Str., Kyiv 03113, Ukraine;  
e-mail: zhovt@ukr.net)

S u m m a r y

The problem of determination of the parameters of a stationary glow discharge is considered in the general statement. The coupled system of nonlinear equations includes the balance equation with regard for diffusion processes for electrons and ions and the Poisson equation for the electric potential. The problem is considered in the spherical and – for comparison – planar geometries. The boundary conditions were determined by the electric current density at the boundaries of the discharge gap; the electron temperature was considered constant. The nonlinear coupled boundary-value problem is solved by using the method of continuation with respect to a parameter. The influence of diffusion processes and the geometry of the gas discharge on its properties are analyzed.