

**DEPENDANCE OF EXCESSIVELY BROADENED  $H\alpha$  PROFILE  
ON CATHODE MATERIAL AND GAS PRESSURE IN A  
GLOW DISCHARGE**

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Excessive Doppler broadening of hydrogen lines has been detected in various types of laboratory plasma for over two decades. However, the exact cause of this phenomenon is a subject of an ongoing debate. The collision model explains this broadening as coming from acceleration of the ions in the electric field, charge exchange processes, and subsequent backscattering from the cathode. It was shown previously that width and shape of hydrogen lines in glow discharge depends on the cathode material. In this paper the collision model for excessive broadening was tested by determining the specific conditions in which the use of material with reduced atom backscattering alters the line shape and space distribution. Copper and graphite cathodes were used in an abnormal glow discharge. Investigation was performed in two orthogonal directions of observation in pure hydrogen and argon-hydrogen mixture. Line profiles were analyzed using the fitting procedure for decomposition of the profile into components that correspond to different excitation processes. It is shown that magnitude of the left wing of  $H\alpha$  profile is reduced only at low pressures and high voltages. Shape of the profile and space distribution is found to depend on discharge parameters for both cathode materials.