

Abstract Submitted  
for the GEC06 Meeting of  
The American Physical Society

**Arc cathode spots and normal spots on glow cathodes: self-organization phenomena**<sup>1</sup> MIKHAIL BENILOV, Departamento de Fisica, Universidade da Madeira, Largo do Municipio, 9000 Funchal, Portugal — Current transfer from high-pressure DC arc plasmas to thermionic cathodes may occur in the diffuse mode, where the current is distributed over the front surface of the cathode in a more or less uniform way, or in a spot mode, where most of the current is localized in one or more small areas. The diffuse mode occurs at high values of the discharge current, spot modes occur at low currents. A similar phenomenon is observed on cold cathodes of DC glow discharges: current transfer can occur in the abnormal mode, where the current is more or less uniformly distributed over the cathode, or in the normal mode, where only part of the cathode is active; the abnormal mode occurs at high discharge currents and the normal mode occurs at low currents. Although physical mechanisms are very different, the overall patterns of the two phenomena are similar: the mode with a uniform current distribution operates on the falling branch of the current-voltage characteristic and is unstable due to a positive feedback; the spot mode operates on the growing section and is stable. In fact, both phenomena represent examples of self-organization. Mathematical descriptions also have important features in common. This allows one to develop a unified treatment of both phenomena, which is a subject of the present work.

<sup>1</sup>Work supported by the project POCI/FIS/60526/2004 of FCT, POCI 2010 and FEDER

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Date submitted: 16 Jun 2006

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