

[Cathode spots in gas discharges high pressure DC: self-organization phenomena](#) (Ref. PTDC/FIS/68609/2006)

**Cientific Responsible:**□

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**Characterization:** The transfer of the current arc discharges of high pressure or in glow discharges, the current to the cathodes may occur on a uniform or a mode where most of the current is located in one or several small areas (spots cathode): spot mode. Although the physical mechanisms of current transfer to thermionic cathodes of the discharge arc high pressure and cold picked for the direct current glow discharges are very different, the overall patterns of appearance of the spots in both types of discharge have several features in common. From the standpoint of theoretical physics general, the same phenomenon of self-organization occurs in the both cathode types of discharge. This project aims to take advantage of this similarity.

**Objectives:**□

- Mode analysis with uniform current distribution and the way spot in the arc discharges in high pressure glow discharges;
- Development of a theory of self-organization in APGD (atmospheric-pressure glow discharges) and arc discharges;
- Identify similarities and differences between the spot modes in both types of discharges and designing the best strategy for developing the theory of spot modes in glow discharges;
- Identify, through analysis of bifurcation mechanisms responsible for the appearance of spots and the conditions under which they arise;
- Identifying characteristics of self-organization that may be useful for understanding the ways in stain glow discharges and also to improve and advance the knowledge gained in arc discharges and methods previously developed simulations.