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Modelling self-organization in DC glow microdischarges in xenon and argon¹ P.G.C. ALMEIDA, M.S. BENILOV, M.J. FARIA, Departamento de Física, Universidade da Madeira, Largo do Municipio 9000 Funchal, Portugal — Self-organized patterns of multiple cathodic spots have been observed in DC glow microdischarges in xenon, but not in other gaseous systems. Recently, a hypothesis has been suggested that these patterns are described by multiple solutions existing at the same discharge current in the theory of glow discharges and such solutions have been found for the case of xenon in the framework of the simplest self-consistent model, which accounts for only one ionic species. However, the question why have the patterns been observed only in xenon microdischarges remains open. In this work, multiple solutions are studied in the framework of a more realistic model of DC glows in xenon and argon, which accounts for two ionic species, several ionization channels, and non-equilibrium population of excited states. It is shown that the conditions of argon microdischarges are less favorable for the existence of multiple solutions and, therefore, for self-organization.

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