



Groupe de Recherches sur l'Energétique des Milieux Ionisés
UMR6606, CNRS-Université d'Orléans

POSTDOCTORAL FELLOWSHIP

Dust particle growth and related phenomena in low-pressure plasmas

GREMI, Groupe de Recherche sur l'Energétique des Milieux Ionisés
UMR6606 CNRS-Université d'Orléans
Rue Gaston Berger, BP 4043, 18028 Bourges Cedex, France

Position open from: January 2012
Duration: 1 year (renewable for 1 year)
Salary: about 2 000 euros/month

OBJECTIVE

Low-pressure plasmas can easily produce dust particles using reactive gases or by sputtering the exposed surfaces. Controlling dust particle growth and behavior is of major interest for many applications. These dust particles can be a serious issue in microelectronics where cleanliness is required or useful for designing nanoparticles and nanostructured materials or simulate astrophysical aerosols.

The postdoctoral fellow will mainly perform experimental works on reactive plasmas (hydrocarbon chemistry) produced in capacitively-coupled rf discharges. Theoretical and numerical approaches will be also envisaged. Three main topics will be investigated: growth kinetics and molecular precursors, void (central dust-free region) characterization, dusty plasma instabilities. Several diagnostics will be used and especially emission spectroscopy, video imaging and electrical measurements, ... Characterization of the deposited dust particles will also be performed.

CONTEXT

This work is in the framework of a 3 year project selected and funded by the ANR (French National Agency for Research): INDIGO (INstabilities and Dust in Ionized Gases: Outlook) and starting in November 2011. The GREMI laboratory is about 75 people on two sites, in Orléans and Bourges, 120 km apart. The postdoctoral work will be in Bourges but a strong interaction (regular meetings, collaborative works) between the two sites is expected on most of the topics.

BACKGROUND AND SKILLS

A background in low-pressure plasmas and related diagnostics is required. Knowledge in reactive or in dusty plasmas will be an evident asset.

REFERENCES

- *Determination of the electron temperature by optical emission spectroscopy in a 13.56 MHz dusty methane plasma: Influence of the power*
V. Massereau-Guilbaud, I. Geraud-Grenier, A. Plain, J. Appl. Phys. **106**, 113305 (2009)
- *Nitrogen effect on the dust presence and behavior in a radio frequency CH₄/N₂ discharge*
J. Pereira, V. Massereau-Guilbaud, I. Geraud-Grenier, A. Plain, J. Appl. Phys. **103**, 033301 (2008)
- *Dust particles in low-pressure plasmas: Formation and induced phenomena*
M. Mikikian, M. Cavarroc, L. Couëdel, Y. Tessier, L. Boufendi, Pure Appl. Chem. **82**, 1273 (2010)

CONTACTS

For any information, please contact the following persons

Prof. Véronique MASSEREAU-GUILBAUD

Tél. +33 (0)2 48 27 27 41

veronique.massereau@univ-orleans.fr

Dr. Isabelle GERAUD-GRENIER

Tél. +33 (0)2 48 27 27 38

Isabelle.Geraud@univ-orleans.fr

Dr. Maxime MIKIKIAN

Tél. +33 (0)2 38 49 48 81

maxime.mikikian@univ-orleans.fr

Université d'Orléans - 14 rue d'Issoudun - B.P. 6744 - 45067 ORLEANS Cedex 2 (France)

Tel. : (33) 2 38 41 70 01 ou (33) 2 38 49 46 26 Fax : (33) 2 38 41 71 54 e mail : adm.gremi@univ-orleans.fr