Self-organization of weakly magnetized plasmas under external forcing

O. Agullo[1], Y. Camenen[1], N. Claire[1], N. Dubuit[1], A. Escarguel[1], G. Fubiani[2], R. Gueroult[2], G. Hagelaar[2], V. Dolique[3], N. Plihon[3]

[1] *Physique des Interactions Ioniques et Moléculaires, UMR 7345, Marseille*
[2] *Laboratoire Plasma et Conversion d'Energie, UMR 5212, Toulouse*
[3] *Laboratoire de Physique, UMR 5672, Lyon*

This poster summarizes a scientific program, gathering three labs in France, focusing on plasma self-organization.

A comprehensive understanding of the plasma self-organization and large-scale dynamics under external forcing is still lacking. Progress on this problem hinges on accounting for the combined effects of boundary conditions, small scale turbulence, neutrals and plasma generation mechanisms. This project aims to study this complex system using a combination of theory, numerical simulations and dedicated experiments on two linear devices, with special attention to the transition from weak to moderate magnetization regime and different ionization fractions. A practical goal will be to study the influence of boundary conditions on plasma currents and rotation, e. g. when biasing various electrodes. Both particle in cell and fluid simulations will be used to confront experimental results, each offering insights into different plasma density regimes. We consider this project to be a stepping stone both for fundamental applications, diagnostic developments and designing next device experiments.

Feedbacks and comments from the community are warmly welcome.

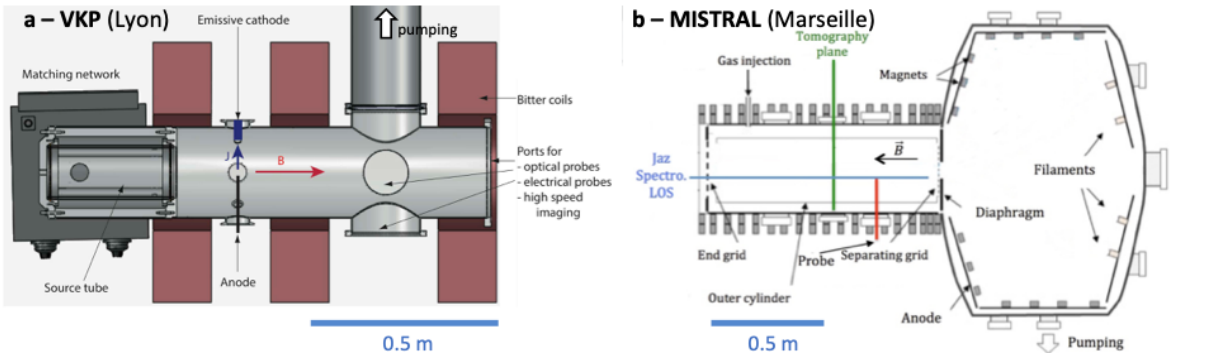

Figure 1: Linear plasma experiments to be used in the project: Von Karman plasma (VKP) experiment in Lyon (a) and Mistral in Marseille (b).

Références

[1] Claire *et al.*, Phys. Plasmas **25** 061203 (2018)
[2] Plihon *et al.*, J. Plasma Phys. **81** 354810102 (2015)
[3] Gueroult *et al.*, Phys. Plasmas **26** 043511 (2019)
[4] Fubiani *et al.*, New J. Phys. **19** 015002 (2017)
[5] Hagelaar *et al*, Plasma Phys. Control. Fusion **53** 124032 (2011)
[6] Agullo *et al.*, Phys. Plasmas **24** 042308 (2017), Part I (see also Part II)
[7] Camenen *et al.*, Plasma Phys. Control. Fusion **59** 034001 (2017)

Statut : permanents