

**Master M2 « Plasma Physics and Fusion »****Proposition de stage** (5 à 6 mois à partir de mi-mars) : **Yes****Internship supervisor**

Name :	DUFOUR	Firstname :	Thierry
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Laboratory name : laboratory name: LPP

ID: UMR 7648	Institution : Sorbonne Université
Site Internet / web site: www.lpp.fr	
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Lieu du stage ou de la thèse / internship or PhD place: Campus de Jussieu.	

Title Characterization of cold plasma therapeutic devices - Application to lung cancer treatment**Summary**

Our research team specializes in cold plasma technologies for medical applications, particularly in oncology. With an emphasis on addressing non-small cell lung cancer (NSCLC) – the most common type of lung cancer, which accounts for 80% of cases with poor prognosis – we are exploring innovative treatments using cold atmospheric plasma (CAP). Current studies show that CAP treatments can induce immunogenic cell death, stimulate immune cell activation, and upregulate PD-L1 expression on tumor cells, highlighting its potential for combined therapy with anti-PD-L1 immunotherapy.

We have developed two advanced plasma sources to target lung tumors: the DBDmed (Dielectric Barrier Discharge with mesh counter-electrode) and the ORJET (Atmospheric Pressure Plasma Jet with dual ring electrodes). Both devices have demonstrated significant antitumor effects, though challenges remain in achieving complete tumor regression and optimizing CAP delivery in lung tissues.

The primary aim of this internship is to conduct a physico-chemical characterization of these plasma devices to deepen our understanding of their interaction with biological tissues. The trainee will utilize cutting-edge diagnostics to characterize plasma properties, including: electrical measurements (current, voltage, electric field probes), optical emission spectroscopy (OES) and mass spectrometry for the detection of reactive oxygen species, ICCD camera imaging for guided streamer dynamics, infrared and CMOS imaging for thermal and fluid kinetic analysis. These characterizations will be achieved on bio-relevant supports to mimic human tissue response. The solicited trainee will also contribute to ongoing investigations into the mechanisms of immune activation and PD-L1 expression triggered by CAP.

The internship will be hosted at the Laboratory of Plasma Physics (LPP), Sorbonne Université, under the supervision of Dr. Thierry Dufour and Dr. Manon Soulier, in collaboration with Pr. Isabelle Cremer at the Cordeliers Research Center, renowned for its pioneering work in inflammation, immunotherapy, and oncology.

This internship offers a unique opportunity to contribute to translational plasma medicine research. The results will form the basis of a scientific publication, with the trainee recognized as a co-author.

We seek a highly motivated Master 2 student with a background in plasma physics, applied physics or related fields. A strong interest in biomedical applications and hands-on experience with diagnostic tools will be advantageous.

Application process: Please, send CV and motivation letter to Dr. Thierry Dufour (thierry.dufour@sorbonne-universite.fr) before 05/12/2024

Possibility of PhD ? Yes (if candidate is successful at Doctoral School contest)**Financial support for internship:** Yes**Financial support for the PhD:** Doctoral school (EDPIF 564)**Type of internship:** Experiment