Context:
Plant physics has become a dynamic field since the last 15 years as many collaborations between plant biologist and physicists have developed. The aim of this project is to focus on the mechanisms of sap ascent in plants which relies on the use of negative pressures. This key phenomenon in the physiology of plants is a question of prime importance due to the strong constraints and trade-off it must deal with. It put the plant vascular networks at high risks of air embolism (gas bubbles nucleating due to the liquid metastability that block the water movement through the xylem) leading to its death. The spreading of air-embolism in the hydraulic network of leaves is then a key point of drought resistance.

In the context of the **PhySap** ANR project, several new approaches are developed to observe and evaluate the formation and propagation of air embolism. The project is between Institut de Physique de Nice (INPHYNI), Laboratoire Interdisciplinnaire de Physique (Liphy, Grenoble) and Laboratoire de Physique et Physiologie Intégratives de l'Arbre en environnement Fluctuant (PIAF, Clermont-Ferrand). **It consists in studying both real and synthetic xylem networks.**

Post-doc position in INRAE (Clermont-Ferrand, France)

The present position concerns the real leaves case and will be done in collaboration with the partner in Nice (INPHYNI).

Embolism spreading in leaves: high speed optics observations
In the context of the PhySap ANR project, a novel experimental approach will be developed to observe and evaluate the formation and propagation of air embolism in real leaves. Different leaf venation patterns will be studied using a non-invasive method: the optical technique coupled to high-speed imaging. The setup has been developed for artificial biomimetic structures and will be now used for real leaves. The goal is to determine if embolism formation occurs at the contact zone between two vessels, how the cavitation clusters form, and how the propagation of embolism is influenced by the characteristics of the vessels and the venation pattern of the leaf. The post-doc will develop the experimental setup that involve the recording with high-speed camera in collaboration with the INPHYNI lab (CNRS, Nice) and will adapt it to the case of real branches under drying conditions.
The 1 year position will be available from 01/03/2022 and will take place in the SurEau team of the PIAF lab (Clermont-Ferrand, France).

Required skills:
- Expertise in programming, such as Matlab and/or C.
- Expertise in image analyses (ImageJ)
- Some knowledge on plant and/or hydraulics would be desired but it is not required.
- Fluency in English.

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