**Name of the Host Laboratory**  
IPVF  

**Website of the Host Laboratory**  
https://www.ipvf.fr/  

**Research Group**  
Optical characterization team  

**Internship Supervisor**  
Amaury Delamarre  

**Internship Subject**  
New luminescence characterization methods applied to solar cells  

**Student’s level**  
- Advanced Undergraduate Students (3rd or 4th year)  
- Master’s students (1st or 2nd year)  
- PhD students  

**Proposed Duration**  
- 3 months  
- 4 months  
- 5 months  
- 6 months  

**Prerequisites**  
The candidate must have followed classes on the physics of semiconductor. Knowledge on optics would be appreciable.  

**Internship description (max. 15 lines)**  
Next generation photovoltaics, that will play a major role in the transition towards carbon neutrality, will include new materials in so called tandems architectures. Those new material will most likely be polycrystalline thin films (perovskites, CIGS, CdTe…), with micrometer scale grains. Due to such a structure, inhomogeneous properties are observed, in terms of absorptivity, carrier lifetimes, mobilities… Multiscale methods to probe them are needed. Luminescence, i.e. light emission under carrier injection, can provide data with a spatial resolution when cameras are used. Nevertheless, various techniques exist (cathodoluminescence (CL), electroluminescence (EL), photoluminescence (PL)…), which are difficult to correlate with each other, and with the device figure of merits, despite great promises. A new theoretical framework has been recently developed to do so (publication in preparation). The work to perform during the internship will be to propose and perform experiments to take advantage of this new approach. Various materials, and various characterisation benches (CL, EL, PL and others…) are available, providing many opportunities for the intern to tackle the project objectives and gain experience.  

A longstanding collaboration exists between the IPVF and the laboratory of Professor Sugiyama at the University of Tokyo, in the frame of NextPV, resulting in many publications in the field of photovoltaics in general and luminescence characterisation in particular. Exchanges between both groups are expected.  

The boxes marked with cross implies eligible