



Thermophotovoltaic batteries

The Solar Energy Institute at Technical University of Madrid (IES-UPM) is looking for a candidate willing to follow the PhD to develop **thermophotovoltaic** (TPV) devices. The PhD work will be aligned to a recently granted EU project (THERMOBAT) where a new kind of energy storage device will be developed. The system is called “latent heat thermophotovoltaic battery” and will be co-developed by five companies and research institutions in the EU. The final goal of the project is to scale up the R&D findings of a recently finished EU project (AMADEUS) and build a 100-kWh demonstrator that will be tested in real conditions.

TPV is the core of this system, as it converts **radiant heat** (from stored heat) directly into electricity. TPV devices are like solar cells but made of infrared **semiconductors** to absorb the infrared part of the spectrum. During the last few years, improvements in the TPV technology has enabled to reach a record conversion efficiency of over 30 %, thus, becoming the most efficient solid-state thermal-to-electric energy converter developed so far.

The candidate will contribute to the development of the TPV modules (an array of individual TPV cells) that will be integrated in the final energy storage prototype. Different kinds of cells will be tested, including those that are under development in our lab in the frame of another PhD work. Thus, a team-work oriented personality is important. The PhD candidate will have full access to the IES-UPM laboratories, which include a complete set of tools for manufacturing and characterizing photovoltaic devices. The work will require intense collaboration with partners, both those that manufacture the TPV cells and the complete system.

REQUIREMENTS

- ❑ Master's degree in mechanical / electrical / materials engineering, or similar.
- ❑ Hands on experience on electron devices (soldering, assembly, etc) will be a plus.
- ❑ Knowledge of technical software and programming languages (CAD, Labview, Matlab, etc.) will be a plus.

GENERAL CONDITIONS

- ❑ Gross salary equivalent to official Spanish PhD fellowships (FPU): 18,200 €/year
- ❑ Incorporation: June 2022 (could be flexible)

APPLICATIONS

Candidates should send his/her **resume** and **transcripts** to Alejandro Datas (a.datas@upm.es)

REFERENCES TO THE TEAM AND PROJECT

IES-UPM laboratory: https://www.ies.upm.es/IES_UPM

AMADEUS project (Euronews report): <https://youtu.be/AyEmd-d-4u0>

AMADEUS (Project video): <https://youtu.be/D7huVnCnK8s>

Latent heat TPV batteries: <https://doi.org/10.1016/j.joule.2022.01.010>

Press release: <https://www.pv-magazine.com/2022/03/23/latent-heat-thermophotovoltaic-battery-for-renewables-storage/>

