UNIVERSIDAD POLITÉCNICA DE MADRID

Expression of Interest – UPM Supervisor

Marie Skłodowska Curie Action –Postdoctoral Fellowship 2023 (MSCA-PF-2023)

Contact Person/Scientist in charge **Name**	Elisa
Surname	Antolin
Email	elisa.antolin@upm.es
Department /Institute /Centre **Name**	Solar Energy Institute / Instituto de Energia Solar
Address	ETSIT, Av. Complutense nº30, 28040
Province	Madrid, Spain
Research Area	Primary: Information Science and Engineering (ENG) Secondary: Physics (PHY) Chemistry (CHE)
Brief description of the Centre/Research Group	The Instituto de Energía Solar (IES) is a research center devoted to the promotion of photovoltaic solar energy. In our research we follow a vertically integrated approach, going from the study of semiconductor materials to the development of complete PV systems. Our research projects cover all PV-related topics, from emerging technologies (2D material solar cells, perovskites) to the recycling of silicon modules and to the qualification of MW-sized solar power plants. IES has a staff of about 60 people, and it belongs to Universidad Politécnica de Madrid in Spain. IES participates currently in five European research projects and about 20 national/regional research projects. The researcher will be hosted by the Silicon and New Concepts for Solar Cells Research Group. The group studies the theoretical limits of the conversion of solar light into electrical power and tests new materials and device architectures, with emphasis in novel technologies that can boost the conversion efficiency. Within this group, E. Antolin is the leader of the 2D material research line, which develops ultrathin, ultralight weight solar cells made of layered materials such as MoS2 and WSe2. E. Antolin is an associate professor. She was a Marie Skłodowska-Curie Posdoctoral Fellow and a Ramón y Cajal Posdoctoral Fellow before. The research line on 2D material solar cells holds a Plan Complementario Grant funded by the Spanish Science Ministry, the Comunidad de Madrid and NextGenerationEU.

UNIVERSIDAD POLITÉCNICA DE MADRID

Expression of Interest – UPM Supervisor

Project description	The main objective of our research line is the development a solar photovoltaic technology 2D semiconductors. These materials could enable the fabrication of solar cells that are up to 10,000 times thinner than current commercial solar cells. This is a ground-breaking technology that could enormously reduce the price and ecological footprint of solar energy. It has also the potential to enable ultra-lightweight, flexible, and semitransparent solar cells, opening the path to new applications in self-powered vehicles, building integration, agrivoltaics, etc. Our research group has developed a MoS2 homojunction solar cell that produces a high open-circuit voltage (S. Svatek et al., 2021. Nano Energy 105427). We have also designed a simple 1D optical cavity architecture that allows us to absorb 90% of incident photons in a MoS2 absorber which is only 10 nm thick (Carlos Bueno-Blanco, 2022. Optics Express 30, 42678). Basing on those results, the objectives of the MSCA project are: - To develop a high-efficiency solar cell from exfoliated MoS2 material (small area, ~ 60 nm thickness, ~ 10% efficiency) - To develop a large-area (~ 1 cm2) using CVD material and/or TMDCs deposited by other methods. - To investigate the role of hot carriers in solar cells made of ultrathin TMDC materials.
Applications: documents to be submitted and deadlines	Letter of motivation and CV **Deadline 25 July 2023**