



POST-DOCTORAL POSITION

Processes Materials and Solar Energy laboratory (PROMES) is a research unit, part of the Institute for Science of Engineering and Systems from the public research organization CNRS¹. The research works at PROMES are centered on the materials under extreme conditions and on the conversion, storage and transport of solar energy. CNRS/PROMES operates many solar facilities located at Font-Romeu-Odeillo, including the large solar furnace of 1 MWth and the 5 MWth solar tower experimental facility Themis. CNRS/PROMES also leads the Labex SOLSTICE Project which is funded by the National Program "Investment for the Future"²

The research group "Thermophysics, Radiation and Fluid Flow for Solar Power Plants" carries out research projects aiming at developing new solutions for future concentrating solar power units. Many projects are focused on concentrating systems, solar receivers and heat transfer fluids (HTF), heat storage materials and systems. Very high energy conversion efficiency is targeted for these components, through very high concentration ratio and very high temperature of fluid. Besides these targeted research actions, a cross-cutting action is carried out aiming at comparing a wide scope of CSP technologies under various resource conditions and production strategies. All the technologies selected for this analysis use solar tower and feature a gas turbine. Then many options are defined by the selection of HTF, the consideration for hybrid systems, the integration of thermal storage and the addition of a bottom steam cycle.

The methodology is based on numerical simulation of the operation of the plant on a daily, monthly or annual timeline to assess key indicators such as the power generated, the conversion efficiency, the solar share and the rate of unmet needs. To this end, a modular modelling approach is proposed, in which the components are modelled separately and are assembled according to each technology. The model is implemented in a Matlab code.

For the simulations, common assumptions will be defined, such as the size of the solar field, the solar resource and the load curve. In each situation, the design of the plant must be optimized for each technology in order to meet the requirements. The figures of merit of the technologies will be discussed and a ranking of the best suited solutions for the various situations will be proposed as a main outcome of the project.

To achieve this objective and take over the program of work presented here above, CNRS/PROMES contracts a young scientist under a post-doctoral position funded by the Labex SOLSTICE Project. He/she will be integrated in the research group "Thermophysics, Radiation and Fluid Flow for Solar Power Plants" of PROMES and his/her activity will be supervised by Dr Alain Ferriere and by Eng. Yann Volut from CNRS. The location is in Font-Romeu (France)³. The duration of the contract is 12 months. An extended term of 12 months might be considered at the end of the first year. The net salary is in the range 24,426 – 28,187 €, according to previous professional experience.

The post-doctoral position is opened to PhD holder with a high level scientific background in thermodynamic cycles, heat transfers and fluid dynamics. The candidate must have a previous professional experience in solar thermal energy systems and skills in modelling and numerical simulation. Capabilities in using Matlab® environment or equivalent are required. Perfectly fluent English language is required since it will be used as working language and of course knowledge of French language would be very useful.

Application letter and curriculum should be addressed to Dr G. FLAMANT, CNRS/PROMES, LABEX SOLSTICE PROJECT, 7 rue du four solaire, 66120 Font-Romeu (France), or transmitted by e-mail to: gilles.flamant@promes.cnrs.fr, with copy to: alain.ferriere@promes.cnrs.fr

Deadline for application: August 29, 2016

¹ See <http://www.promes.cnrs.fr>

² See <http://www.labex-solstice.fr/>

³ See <http://www.font-romeu.fr/>