Science and Innovation with Thunderstorms (SAINT)

PhD in Computational Models of Lightning Discharges

Offer description

One PhD position is available at the Astrophysics Insititute of Andalusia (IAA-CSIC) in Granada (Spain) to investigate the physics of lightning discharges. The position is funded through the Science and Innovation with Thunderstorms (SAINT) European Innovative Training Network. A joint effort by 10 academic institutions and 9 private companies, SAINT offers 15 PhD positions across Europe to form early-stage researchers on all aspects of thunderstorm-related phenomena.

This position concerns the theoretical understanding of a lightning discharge. A lightning channel that progresses towards the ground is surrounded by a multitude of thin ionized filaments forming the so-called lightning corona. A corona is a complex, multi-scale and nonlinear process whose dynamics are currently poorly understood. How do all the filaments interact between each other? How is the corona determining the propagation of the lightning channel? Can we develop simplified statistical models that encapsulate enough of the corona dynamics without resorting to large-scale computations? Are these large-scale computations feasible? These are the questions that this project seeks to answer. Our main tool will be the numerical simulation of the microphysical processes involved in electric discharges but we will also seek simpler models with explanatory power. As coronas not only pose fundamental scientific questions but are also highly relevant for high-voltage applications, this project combines pure science with industrial applications.

The successful candidate will work within the TRansient Plasmas in Planetary Atmospheres (TRAPPA) group (www.trappa.iaa.es) at the IAA (CSIC) (www.iaa.es). There he/she will interact with specialists in various other topics and techniques related with the physics of electric discharges. In particular, we foresee a close collaboration with researchers within the ERC-funded eLightning project (elightning.iaa.es) and with another SAINT-funded researcher in the same group.

As a member of the SAINT network, the sucessful candidate will participate in network-wide training and dissemination activities. The position includes short stays in some of the world leading research centers within the network. Yearly meetings (summer and winter schools) of the complete network are foreseen.

Requirements

The successful candidate has a master in physics, mathematics, engineering or a related field. He/she is interested in scientific computing and in the physical aspects of electric discharges, having some familiarity with topics in statistical mechanics, electromagnetism and plasma physics. He/she must have a good command of the English language and experience with some of the programming languages most commonly used in scientific computing, such as Python, Fortran and C/C++.

Benefits

The salary consists of the gross Monthly Living Allowance of 3,110 EUR per month pondered by the EU correction coefficient (97.6% for Spain); in addition, a Mobility Allowance of 600 EUR per month will be paid, and also possibly another 500 EUR per month of Family Allowance depending on marital status. The ESR salary is subject to local tax, social benefit and other deductions following spanish regulations.

Eligibility Criteria

By EU requirements, elligible candidates may be of any nationality and, at the time of signing the contract upon joining the destination:

- Must be in the first four years (full-time equivalent) of their research careers and have not yet been awarded a doctoral degree. This four-year span is measured from the date when they had obtained the degree which would formally entitle them to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the training will be provided. This applies irrespective of whether he/she intends to obtain a PhD degree in the future.
- Must not have resided or carried out their main activity (work, studies, etc) in the country of their host organisation (Spain in this case) for more than 12 months in the 3 years immediately prior to the reference date. Short stays such as holidays and/or compulsory national service are not taken into account.

How to apply

To apply for this position, send an updated CV and a cover letter to Alejandro Luque (`aluque@iaa.es`).