

The group 'Multiscale Modeling and Nonlinear Dynamics' at the national research institute Centrum Wiskunde & Informatica in Amsterdam searches for

**one PhD student and one postdoctoral researcher for 2 (+1) years
in modeling and computations of sparks and lightning.**

The PhD position will lead to a PhD after 4 years, the postdoctoral position is for 2 years, with possibility of extension by a third year.

Sparks and lightning pave their way through strong enhancement of the local electric field at the tip of growing discharge fingers; electrons are accelerated in this region to high energies very far from equilibrium. In recent years we have developed a growing experimental and theoretical understanding on how single channels grow in ambient air. But do they grow in the same manner at liquid densities and in other media (e.g., in high voltage switches or at high atmospheric densities on Jupiter)? How do they heat up, and when do they later create electric breakdown? Can we catch the essentials of electrodynamics and reactions of a strongly branched discharge tree in a simple reduced model? When does such a discharge emit hard radiation, including gamma rays, and how much?

Theoretical answers to these questions should be developed together with theoretical physicists and computational scientists at CWI and in collaboration with experimental researchers at the departments of electrical engineering and applied physics at Eindhoven University of Technology and with interested companies. The research will also be embedded in international networks on nonequilibrium plasma physics, multiscale nonlinear dynamics, computational science, electrical engineering, and atmospheric electricity.

The projects form part of the research program "Building on Transient Plasmas" of the Dutch Foundation for Technological Research STW, a branch of the Dutch funding agency NWO. Relevant publications of the group can be found on <http://homepages.cwi.nl/~ebert>.

Competences: We are looking for two enthusiastic and independently thinking researchers to strengthen our growing, multidisciplinary and international team. We expect you to be interested in experiments and observations, to be able to develop physical models and explanations, and to have talent and experience in scientific computing.

For the PhD position, a Master degree in natural sciences, preferably in theoretical physics, or in applied mathematics or electrical engineering is required that has to be recognized as a qualification for Ph.D. research by Eindhoven University of Technology.

For the postdoctoral position, a PhD degree in one of the above research fields is required, as well as a good publication list and C.V. and three letters of recommendation.

Offer: The salaries are in accordance with the collective labor agreements (CAO) for Dutch research institutes. The current salary for a first year PhD student is 2.037,- Euro/month; it increases in yearly steps up to 2.610,- Euro/month in the fourth year; no tuition fees are required; the appointments are for 4 years and should lead to a Ph.D. at the end of the period. For a postdoctoral researcher, the salary is 3090,- Euro/month or higher, based on experience.

Applications should be sent before May 31 with a statement of interest, curriculum vitae, diplomas, publications and the names of at least two (for the PhD position) or three (for the postdoc position) scientific referees to Prof. Dr. Ute Ebert: ebert@cwi.nl. She can also provide further information on the position.