ISTITUTO RICERCHE SOLARI LOCARNO
POSTDOCTORAL POSITION

The Istituto Ricerche Solari Locarno (IRSOL, Locarno Monti, Switzerland) invites applications for one postdoctoral contract to work in the project **"HPC-techniques for 3D modeling of resonance line polarization with partial frequency redistribution"**. This research project is funded by the Swiss National Science Foundation (SNSF) within the framework of "Sinergia", a programme promoting interdisciplinary collaboration between two to four applicants on projects involving breakthrough research. This Sinergia grant has been awarded to Dr. Luca Belluzzi (IRSOL), Prof. Rolf Krause (ICS, Lugano, Switzerland), Prof. Javier Trujillo Bueno (IAC, Tenerife, Spain), and Dr. Jiri Stepan (ASCR, Prague, Czech Republic).

The aim of the project is to combine competences and expertise in the fields of theoretical and numerical spetropolarimetry, computational sciences, and high-performance computing (HPC), in order to develop novel accurate and robust parallel solution methods for the radiative transfer (RT) problem for polarized radiation in three-dimensional (3D) models of the solar atmosphere, taking partial frequency redistribution (PRD) effects into account. The selected candidate will closely interact with the postdocs and scientists working on the same project at ICS, IAC, and ASCR. Moreover, he/she will also benefit from scientific collaborations with the POLMAG group of Prof. Trujillo Bueno at IAC (see http://www.iac.es/proyecto/polmag/). The position implies regular working visits to the other research centers involved in the project.

IRSOL is a research institute active in the field of high-precision solar spectropolarimetry. It is the home-base institute of the Zurich Imaging Polarimeter (ZIMPOL), one of the world-leading instruments for solar spectropolarimetry. Complementary research activities are carried out at IRSOL, including instrumental development, observational programs, theoretical modeling, and numerical simulations of the solar atmosphere. IRSOL is involved in international projects such as the European Solar Telescope (EST), the American Daniel K. Inouye Solar Telescope (DKIST), and the Chromospheric Layer SpectroPolarimeter (CLASP). Since 2015, IRSOL is associated with the Università della Svizzera Italiana (USI, Lugano, Switzerland). More information on the Institute is available at http://www.irsol.ch.

Duties: The selected candidate is expected to contribute to the development and application of a non-LTE radiative transfer code for modeling, by means of massively parallel supercomputers, the spectral line polarization produced by the joint action of optical pumping and the Hanle and Zeeman effects in realistic 3D numerical models of the solar atmosphere, taking PRD effects into account.

In particular, he/she will have the following responsibilities:

- To investigate theoretical aspects of the problem in order to drive the activity of the colleagues working on the numerical and computational side.
- To test and apply the newly developed methods of solution and HPC techniques by performing forward modeling calculations of the intensity and polarization of spectral lines of interest for magnetic field diagnostics, in 1D models of the solar atmosphere.
- To organize and carry out, with the help of the IRSOL staff, observational programs of interest for the project, exploiting the IRSOL instrumentation (ZIMPOL).
- To analyse and confront the results of the observations (e.g. from ZIMPOL or CLASP) with the synthetic data that the new 3D non-LTE RT code will provide, thus trying to infer new information on the solar chromosphere and transition region.

- To closely interact with the postdocs and scientists working at the other institutions involved in the project, including regular working visits to their research centers.

- To help with the coordination of the theoretical and numerical developments required for the success of the project, as well as with the representation of IRSOL at the international level.

- To elaborate reports of progress, justification, etc., to the financing entity, in coordination with the PIs and the personnel involved in the project management.

- To contribute to the public outreach activities of the project.

Position requirements: The candidates must have undertaken novel research developments and hold promise to become a leading researcher in the coming years. Candidates with experience on numerical radiative transfer and the theory of polarization in spectral lines are especially welcomed to apply.

Qualification requirements: Applicants must have a **Ph.D. degree in a scientific discipline** (preferably in Astrophysics or Physics) by the starting date of the contract.

Duration: The contract is expected to begin in **early 2019** (exact date to be negotiated), and it will end at the conclusion of the Sinergia project (**30.09.2022**). Subsequently, it can be further extended up to a total duration of four years. The activity of the candidate will be subject to annual revisions.

Research travel funds: The contract includes all the travel expenses needed for the successful development of the project (meetings, workshops, observations, collaborations, etc.).

Remuneration: The gross annual salary for the first year will be CHF 80,000 (the annual salary will gradually increase during the four years of contract).

How to apply: Applications must be sent via e-mail to applications@irsol.ch and must include the following documentation:

- Curriculum Vitae
- Publication list
- Research activity report and statement of suitability for the position (maximum of 2 pages)
- Copy of the national identity document or passport
- Copy of the Master Degree Certificate (ideally with marks)
- Copy of the PhD Degree Certificate

In addition, references (names and e-mails) of three scientists familiar with the work of the candidate must be indicated.

Deadline for submitting applications is **January 7, 2019**

Contact: For scientific enquiries, please contact Dr. Luca Belluzzi (belluzzi@irsol.ch).