

# Job opening for two post-doctoral and two PhD positions in the field of evolved stars and laboratory experiments

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Interdisciplinary project on the stellar winds around evolved stars at the Leuven University in Belgium funded by the ERC-CoG 2014 grant AEROSOL (PI. L. Decin).

## The project

At the Leuven University (Belgium), we seek candidates for two post-doctoral and two PhD research positions, ready to play a key role in a new interdisciplinary project focusing on stellar winds around evolved (low-mass) stars. The candidates will interact closely with a team consisting of astrophysicists, chemists, and computational mathematicians, as the goal of the project is to boost our understanding of the physics and chemistry characterizing these stellar winds. The project builds upon novel data (including ALMA, Herschel, etc.), detailed theoretical wind models, and targeted laboratory experiments (see <http://fys.kuleuven.be/ster/Projects/aerosol/aerosol>).

## Institute of Astronomy

The Institute of Astronomy of the Leuven University is a young and active research group of some 50 scientists, engineers and administrative staff (<http://www.ster.kuleuven.be>). The institute is involved in several international networks and research projects, involving telescopes at international observatories and space missions. The institute is also responsible for the organisation of the Master in Astronomy & Astrophysics of the Faculty of Science at the Leuven University. The institute has a long tradition in the observational and theoretical studies of the late stages of evolution of low and intermediate mass stars.

For the ERC-CoG AEROSOL project of Prof. L. Decin, we seek one post-doc and one PhD candidate to work on the reduction, analysis and (radiative transfer) modeling of a whole suit of observations ranging from the UV to mm wavelength regime with the aim to retrieve the geometrical, thermodynamical and chemical structures of stellar winds. The post-doc preferentially has experience with infrared and (sub)millimeter observations and has in any case sufficient experience in implementing and exploiting radiative transfer models. The post-doc will also be allowed to carry out (part-time) his/her own research in collaboration with affiliated group members. The successful candidates will have access to recently obtained and granted observational data, advanced radiative transfer and forward chemistry modeling tools and will have the possibility to develop their own (hydro)simulations.

## Physical Chemistry

As part of this project, one post-doc and one PhD position is open in the research group of Prof. S. Carl in the field of experimental gas-phase reaction kinetics in the Department of Chemistry, division of Quantum and Physical chemistry, beginning preferably on 1st October 2015. The experimental work will be carried out in the modern and fully-equipped new research laboratories of the Department of Chemistry, opening in mid 2015. The experimental research concerns the determination of rate coefficients and product distributions of elementary gas-phase reactions involving key reactive species (Si- and S-bearing species and HCCO radicals) in stellar winds for which data is currently lacking. Specifically, several advanced laser-spectroscopic and chemiluminescence techniques will be employed by the PhD student to follow photolytically-generated reactive species in real time in a novel temperature-graded reaction vessel (200-900 K) coupled with cavity-ringdown/Fourier-transform infrared spectroscopy to elucidate reaction product channels. The post-doc will concentrate on the construction and exploitation of a novel low-temperature Laval-nozzle apparatus with the aim to obtain the rates of the same gas-phase reactions at temperatures below 200 K.

Candidates should have an interest in physical chemistry, high-resolution laser spectroscopy, and technical experimentation. The group currently enjoys and encourages further close collaboration with researches in the department employing high-level quantum chemical calculations on species related to this project.

## The position

At the Leuven University, the candidates will join the Institute for Astronomy (Prof. L. Decin) or the Physical Chemistry section (Prof. S. Carl). The interdisciplinary project is carried out in collaboration with Prof. T. Millar (Belfast University) and Prof. J. Nuth (NASA, Greenbelt). The four candidates will interact closely with the other team members at the Institute of Astronomy and Department of Chemistry. At the Leuven University, we have access to parallel computing facilities, to be exploited extensively in this project.

## Contract

The PhD candidates will be employed for a 2+2 (after positive evaluation) period at the Institute of Astronomy or a 2+1 period at the Department of Chemistry. The initial contract for the post-doc positions runs over 2 years and could be prolonged with another year after positive evaluation. The salary will be commensurate to the standard scale for PhD and post-doctoral researchers at the Leuven University. The preferred starting date is between 1 October 2015 and 1 December 2015, but will be adapted to the selected candidate's availability. Candidates are thus requested to indicate their preferred starting date in the application.

## Interested?

The successful post-doc candidates must have a PhD degree in astrophysics or chemistry, while the PhD candidates must have obtained a master degree in (astro)physics, mathematics or chemistry. The application must include

• A Curriculum Vitae (including publication list).

• A statement of research interests and future plans (maximum 3 pages).

• A letter detailing your specific qualifications for the position and your career/educational goals (maximum 1 page).

• Two letters of recommendation from professors well acquainted with your academic achievements. The letters are to be submitted separately to the address mentioned below.

DEADLINE for the application: 1 May 2015

More information can be obtained by contacting