



Candidate Information

Position:	Research Fellow in Supernova Modelling
School/Department:	School of Mathematics and Physics
Reference:	23/110875
Closing Date:	Monday 29 May 2023
Salary:	£36,333 per annum
Anticipated Interview Date:	Monday 26 & Tuesday 27 June 2023
Duration:	Available until 31 March 2026

JOB PURPOSE:

To work on the development and application of numerical radiative transfer simulations for the study of supernovae. This will involve development work on our Monte Carlo radiative transfer codes, incorporating the latest state-of-the-art atomic data into our modelling database, carrying out full simulations at supercomputer facilities, and collaborating on the use of these results for the interpretation of astrophysical observations. The successful candidate will work within the Astrophysics Research Centre in the School of Mathematics and Physics as part of a STFC funded project.

MAJOR DUTIES:

1. Carrying out numerical radiative transfer simulations with the ARTIS Monte Carlo simulation tool for supernova models.
2. Development work on the code, as motivated by the scientific aims of the project. This may include implementation of new physical processes and managing the incorporation of new atomic data.
3. Analysis and interpretation of simulation results. This to include extraction of synthetic spectra and light curves from the simulations and analysis of internal thermodynamic / plasma state variables.
4. Managing simulations outputs – including archiving and maintaining records of simulations and their outputs.
5. Assist in the preparation of proposals for access to high-performance computing systems at national and international level.
6. Write peer-reviewed publications and present findings at conferences and/or workshops.
7. Help supervise and support/mentor postgraduate and undergraduate students within the post holder's area of expertise and under the direct guidance of a member of academic staff.
8. Ensure up-to-date knowledge of the state-of-the-art within the research field through scholarly activities.
9. Assist in the preparation of funding proposals where relevant.
10. Undertake supplementary duties relevant to the success of the project including administrative duties and additional training and development activities as required.

ESSENTIAL CRITERIA:

1. Normally have or be about to obtain a PhD in astronomy or astrophysics (NB: 'About to obtain' is normally defined as within 6 months of application date).
2. At least 3 years relevant research experience in the following areas:
 - Radiative transfer simulations, including Monte Carlo methods;
 - Numerical simulation for astrophysics; and
 - Supernova spectral/light curve modelling, and interpretation of observational data.
3. Strong publication record commensurate with stage of career.
4. Ability to contribute to broader management and administrative processes. Willingness to help with administration and preparation of computer time proposals.
5. Contribute to the School's outreach programme by links with industry, community groups etc.
6. Ability to program in C / C++ and python (or related languages).
7. Ability to assess and organise resources.
8. Ability to effectively communicate complex information in English in oral and written format.
9. Ability to build relationships to develop internal and external networks.

10. Commitment to continuous professional development.
11. Practical problem-solving skills, independence of thought and initiative.
12. Demonstrable ability to positively interact with research colleagues and other staff.

DESIRABLE CRITERIA:

1. Experience of using high-performance computing facilities in research, including resource management.
2. Experience of using multi-dimensional Monte Carlo transport codes, such as the ARTIS code.
3. Appreciation of the atomic structure and associated collisional processes to be integrated within ARTIS.
4. Experience of simulation code development and parallelisation.
5. Experience of writing proposals for high-performance computing facilities.
6. Experience of managing high-performance computer resources.
7. Willingness to travel for periods of time for the purposes of attending conferences or collaborative visits.