
Postdoc position at Trinity College Dublin in open quantum systems theory for spin systems.

Background

A 2-year postdoc position is available at the School of Physics, Trinity College Dublin, Ireland (www.tcd.ie/Physics). The position is sponsored by the European Research Council through the Starting Grant AI-DEMON: Artificial Intelligence Design of Molecular Nano-Magnets and Molecular Qubits.

The aim of this project is to push the boundaries of the state-of-the-art in the computational modelling and design of magnetic molecules. The interaction between spins and phonons is one of the main limits to the development of spin quantum technologies and in this project we will use first-principles and open quantum systems theory to unravel the details of spin-phonon coupling and develop new magnetic molecules with long spin coherence and lifetime[1-5]. The project will be developed by the group of Prof. Lunghi at the School of Physics, Trinity College Dublin.

What we offer

The appointee will join the group of Prof. Lunghi at the School of Physics of Trinity College Dublin and together with other members, they will have the opportunity to be a key player in a cutting edge research project and fully develop their potential in a supportive and friendly environment. The appointee will receive a top-class training in open quantum systems theory, and computational physics/chemistry and will develop a very innovative research profile in computational condensed-matter physics. The appointment will initially be made for 1 year and with a gross annual salary in the order of EUR 42,000. Upon successful performance during this initial period, a one-year extension of the contract will be offered to the candidate. The position is available to be filled as soon as possible.

What we are looking for

The ideal candidate is a strongly motivated researcher that is looking for a place to develop their own scientific and research skills. The candidate will be required to contribute to the research group by actively participating to scientific discussions and creating a supportive work environment. Among the main technical tasks, they will be expected to contribute to the overall efforts of the research group by developing a quantitative theory of spin decoherence in molecular materials. This will involve the design of novel software that brings together ab initio methods and open quantum systems theory, liaise with experimental collaborators, and publish scientific papers in the main international journals. Interests and experience in scientific dissemination and outreach will also be positively considered.

Selection Criteria

Essential:

- A Ph.D. (or a recently submitted thesis awaiting evaluation) in Physics or another related scientific discipline;
- Understanding of the basic principles of quantum mechanics;
- Experience in at least one of these programming languages: Python, Julia, FORTRAN, C/C++;
- Good spoken and written English and the ability to work both independently and in a team;
- Strong motivation to advance the project by pro-actively developing personal ideas.

Highly Desirable:

- Experience in open quantum systems theory.

Application Procedure

All the correspondence regarding this position, including informal inquiry and formal application, should be addressed to Prof. Alessandro Lunghi (lunghia@tcd.ie).

Applications must include:

- 1) A cover letter detailing how you meet the selection criteria for the post;
- 2) A complete academic CV including a full list of scientific output;
- 3) The e-mail contacts of at least two referees who have agreed to provide a reference letter;

Review of the applications will start on the 1st of January 2024 at the latest and the position will remain open until a suitable candidate is identified. A first round of interviews is expected to be held no later than the mid-January 2024 and will be held remotely. The position is available immediately.

Equal Opportunities Policy

Trinity is an equal opportunities employer and is committed to employment policies, procedures and practices which do not discriminate on grounds such as gender, civil status, family status, age, disability, race, religious belief, sexual orientation or membership of the travelling community. On that basis we encourage and welcome talented people from all backgrounds to join our staff community.

References

- [1] Science advances 5, eaax7163 (2019)
- [2] The Journal of the American Chemical Society, 143, 13633-13645 (2021)
- [3] Science Advances, 8, eabn7880, (2022)
- [4] The Journal of the American Chemical Society, 144, 22965-22975 (2022)
- [5] Nature Reviews Chemistry, 6, 761-781 (2022)