

The [Ultrafast Science of Quantum Materials](#) group at [IMDEA Nanoscience](#), Madrid is pleased to offer a [2-year postdoctoral position](#) and a [fully funded 4 year PhD position](#) studying ultrafast imaging and spectroscopy inside quantum materials:

1) [FPI PhD Fellowship](#) in *Ultrafast Nanoscale Dynamics in Quantum Materials and Devices*

PhD position examining the nanoscale structure and dynamics in quantum materials and neuromorphic devices using X-ray coherent diffractive imaging and nanofabrications methods in two inter-related sub-projects. In one the student will manufacture structured ferroelectric films for demonstration of our newly developed nonlinear X-ray imaging method; in the other, the student will produce current-switched memristive devices from quantum materials and use coherent X-ray imaging to track the nanoscale dynamics of the switching under steady-state and pulse current excitation. The projects are closely linked through the materials classes, fabrication methods and imaging methods. Experiments will be carried out both in our one-of-a-kind ultrafast XUV imaging beamline at IMDEA and at large scale X-ray facilities worldwide. A solid background in optics, nanofabrication and/or condensed matter physics is desirable. This position is supported by an FPI fellowship from the Agencia Estatal de Investigacion of Spain.

Most relevant recent publications:

- A. Sarkar and A.S. Johnson, New J. Phys. 28 094101 (2026)
- A. Sarkar and A.S. Johnson, Mater. Adv. 5, 6378-6387 (2024)
- A.S. Johnson et al., Nature Physics 19 (2), 215-220 (2023)
- A.S. Johnson et al., Science Advances 7 (33), eabf1386 (2021)

2) [2-year postdoctoral position](#) in *Few-Femtosecond Phase Transitions in Quantum Materials*

Funded by the European Research Council/Agencia Estatal de Investigacion of Spain and exploring photoinduced phase transitions on the sub-50 fs timescale. The postdoctoral fellow will lead experiments to track the establishment of photoinduced ordering in manganites using a variety of spectroscopic tools, as well as the leveraging of photoinduced phase transitions to drive novel nonlinear optical processes. The successful application is expected to begin in the fall, with the exact start date flexible.

Apart from a PhD in physics, chemistry, or similar, the candidate should have experience in at least some of the following areas:

- Amplified femtosecond lasers, few-cycle pulse compression, pulse characterization methods
- Attosecond/X-ray beamlines, high vacuum systems, cryogenics, compressed gas handling
- Quantum materials/ultrafast dynamics of materials

- Laboratory control coding (python preferred)
- Data analysis, training students, experimental design

As well as possess good communication skills, personal organization and team spirit.

Most relevant recent publications:

C Brahms et al., Nature Communications 16 (1), 3714 (2025)

L Zhang et al., npj Quantum Materials 10 (1), 32 (2025)

A.S. Johnson et al., Nature Physics 20, 970–975 (2024)

D Perez-Salinas, AS Johnson, D Prabhakaran, S Wall. Nature Comms. 13, 1-8 (2022)

Applications: Applications must be made via the [IMDEA careers portal](#). Please include a CV and two references. Informal queries can be addressed to the group leader, "Ramon y Cajal" researcher Dr. Allan Johnson at allan.johnson@imdea.org. We especially welcome applications from women and other under-represented groups in physics.

About the group: The Ultrafast Science of Quantum Materials group at IMDEA Nanoscience in Madrid, Spain studies light-driven phenomena in quantum materials, particularly phase transitions and the out-of-equilibrium phases using a variety of laboratory and facility-based experiments. Currently consisting of 9 members from 4 continents, we pride ourselves on a creative and welcome environment. Based in the north of Madrid at the Campus of International Excellence UAM+CSIC, IMDEA Nanoscience is dedicated to the exploration of nanoscience and the development of applications of nanotechnology in connection with innovative industries.

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nanociencia.imdea.org



Allan S. Johnson

Research Professor

[Ultrafast Science of Quantum Materials](#)

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