

Call for research positions at the
Centro de Astropartículas y Física de Altas Energías
– Universidad de Zaragoza – within the *DarkQuantum* project
1 PhD position

Job description:

The Centro de Astropartículas y Física de Altas Energías ([CAPA](#)) is a leading institution in the search for dark matter, among other research topics. In particular, the host group of the current position at CAPA has a leading role in the International Axion Observatory ([IAXO](#)) experiment, as well as in the [RADES](#) project. The near-term goal of the IAXO collaboration is the construction and operation of [BabyIAXO](#), an intermediate stage to serve as prototype of the final IAXO systems, but already with a relevant physics program in itself. BabyIAXO is under construction at DESY, Hamburg. Its primary aim is the detection of axions emitted by the Sun, although its 10-m long magnet could host other type of setups. Axions are particles hypothesized to solve the strong-CP problem of the Standard Model of Particle Physics. They are also very motivated candidates to compose the missing Dark Matter of the Universe. The RADES project aims at developing new variants of the *axion haloscope* technique to directly detect axions from our dark matter halo. Part of RADES program will take place inside the BabyIAXO magnet.

The **DarkQuantum** ERC-SyG project recently awarded aims at developing novel quantum sensing techniques, and apply them to the RADES axion haloscopes. The resulting quantum-enhanced RADES setups could enjoy unprecedented sensitivity to dark matter axions. Some of the sensors to be developed within the project are expected to be installed underground in the Laboratorio Subterráneo de Canfranc ([LSC](#)). The DarkQuantum project will be carried out within the RADES international collaboration, and in particular in connection with experts in quantum technologies, like [ENS-Paris](#), [Aalto University](#) and [Kalsruhe Institute of Technology](#).

The position here offered is intended to reinforce the leadership role of the CAPA group in the DarkQuantum project, which involve development of axion haloscopes, quantum sensors, and the corresponding ancillary systems, cryogenics, RF readout, electronics,... It will also include simulation and data analysis tasks. The work will be done in close connection with the rest of members of the RADES and IAXO international collaborations, including first-level institutions like DESY (Hamburg), MPP (Munich) or CERN (Geneva).

This is the first call for positions of the ERC-SyG DarkQuantum project. A forthcoming set of positions is foreseen for a later moment of the project.

The group also accepts applications for shorter “introduction to research” studentships, typically for students following, or having just finished, master studies (see independent brochure for explanation).

Candidates:

We seek excellent and motivated candidates with good University qualifications in a physics degree or similar, ready to embark in a doctoral program (master or equivalent level). We will value previous experience in particle or astroparticle physics experiments, as well as interest and expertise in instrumental developments and software knowledge.

Positions:

The PhD position is a four-year contract compatible with standard UNIZAR pre-doctoral positions. Salary complements are foreseen if the candidate is successful in competitive public pre-doctoral fellowship calls. The candidates will enjoy a lively research environment at CAPA as well as in the IAXO and RADES international collaborations. As part of the doctoral program, they will have the opportunity to perform stays in other collaborating institutions as well as to attend schools and conferences.

The Universidad de Zaragoza is committed to the “European Charter for Researchers” and the “Code of Conduct for the Recruitment of Researchers”, and has been recognized by the European Commission with the Human Resources Strategy for Researchers (HRS4R) award. <https://hrs4r.unizar.es/en>

Application:

Interested candidates should send their CV, a letter of motivation and the certificate of University qualifications to:

iaxorecruitment@unizar.es.

Deadline:

The starting time of the contracts can be negotiated with the selected candidates and are expected to be fixed by mid 2025. The selection process is expected to take place by 31st


March 2024, although candidacies may be accepted at any time, also after that date, until satisfactory candidates are selected.

More info:

More details on the research performed in our group can be found here:
<http://gifna.unizar.es/iaxo/>

Please contact Igor.Irastorza@cern.ch for any addition information.

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