MARIE SKŁODOWSKA-CURIE POSTDOCTORAL FELLOWSHIPS 2024

EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS

HOST INSTITUTION

FCT NOVA | NOVA School of Science and Technology

RESEARCH GROUP AND URL

LIBPhys-UNL

SUPERVISOR (NAME AND E-MAIL)

Pedro Amaro pdamaro@fct.unl.pt

SHORT CV OF THE SUPERVISOR

Pedro Amaro is Assistant Professor at the Physics Department of NOVA School of Science and Technology, as well as Visiting researcher at Max-Plank Institute for Nuclear Physics. His research interests include topics of atomic physics and x-ray spectroscopy, including both experimental and theoretical aspects: laboratory measurement of cross sections atomic processes relevant for astrophysics; laser spectroscopy in muonic atoms; two-photon and second-order processes; atomic structure and resonant processes; plasma modelling; x-ray fundamental parameters; x-ray fluorescence spectroscopy and applications. Published 60 articles.

5 SELECTED PUBLICATIONS

- [1] P. Amaro, et al, Phys. Rev. A, 103, 012811 (2021).
- [2] J. J. Krauth, CREMA collaboration, Nature, 589, 527-531 (2021).
- [3] F. Grilo, et al, Astrophys. J., 932, 140, (2021).
- [4] C. Shah, et al, Astrophys. J., 881 100 (2019).
- [5] P. Amaro, et al, Phys. Rev. A, 93, 032502 (2016).

PROJECT TITLE AND SHORT DESCRIPTION

Relativistic evaluation of two-photon rates with astrophysical interest

This theoretical project focus on a systematic evaluation of two-photon rates of astrophysical interest. The forbidden transition of 2s-1s is a prime example of the substantial experimental and theoretical work dedicated to the first excited state of the simplest atom of hydrogen and this effort was originally triggered from astrophysics, since it is the prime source of continuum. Besides H-like and He-like ions, there are no calculations of TP for other isoelectronic sequences available nowadays [5]. Such cases include the isoelectronic sequences of alkaline-earth metals, such as Be-like or Mg-like ions. Following previous works, TP rates will be evaluated with second-order calculation based on a B-splines representation of the Dirac spectrum [5]. Moreover, this last B-splines calculation can be applied to evaluation of resonances in cavities [1]. The role of these new calculations will be attested in astrophysical collision-radiative models (e.g. [3,4]) to answer recent discrepancies in observations. It's expected the candidate to have strong programing and modeling skills.

SCIENTIFIC AREA WHERE THE PROJECT FITS BEST*

PHY