

The Nanoscience Cooperative Research Center, CIC nanoGUNE, located in Donostia / San Sebastian, Basque Country (Spain), is currently looking for a

MASTER STUDENT

to work on

Evolution of an electron projectile wave-packet in a solid

NanoGUNE is a research center devoted to conducting world-class nanoscience research for a competitive growth of the Basque Country. NanoGUNE is a member of the Basque Research and Technology Alliance ([BRTA](#)) and is recognized by the Spanish Research Agency as a *María de Maeztu* Unit of Excellence.

The position is offered in the **Theory Group**, led by **Emilio Artacho**. More information can be found at <https://www.nanogune.eu/en/research/groups/theory>

Project Description

Particles impinging on matter at high energies produce radiation damage. Part of the damage is due to secondary electron projectiles (electrons kicked by the primary projectile which become projectiles themselves). Indeed, it is known that the vast majority of the damage in living tissue (as when irradiating with ions in cancer radiotherapy) is produced by low-energy secondary electrons. We have been investigating that kind of radiation damage for heavier projectiles using first-principles dynamical simulations for a classical projectile perturbation moving through a target system (solid, liquid), but the classical treatment of electrons is not reliable enough.

The idea in this project is doing computational first-principles quantum dynamical calculations for a projectile electron described by a quantum wave packet traversing a solid or liquid. We will be using real-time (discretised) time-dependent density-functional theory with ready-made programs that run over many CPU cores in parallel, and/or GPUs. The key challenge will be extracting the information from the simulations that could be used to calibrate phenomenological simulations used in ion therapy facilities like the one being deployed in Donostia.

Candidates should **apply** by following the instructions and recommendations of the general call and by completing the form below and attaching the following documents:

- a. A complete CV
- b. Academic record and cover letter grouped in a single PDF file

The **deadline** for applications is **06/04/2026**.

NOTES:

- (i) All applicants will receive an answer after the end of the selection process; but please note that due to the large number of submissions that are expected, we cannot provide individual feedback.
- (ii) Additional information about nanoGUNE's commitment towards [HR excellence in Research and Gender Equality](#) are available on our website.
- (iii) We encourage you to subscribe to our [HR mailing list](#) to receive information related to nanoGUNE's open positions and open calls for different training and talent attraction programs.