



JOINT EUROPEAN MASTER IN NUCLEAR PHYSICS

Academic Year 2025/2026

MASTER THESIS PROPOSAL

TITLE: Causal transport coefficients of heavy particles

SUPERVISOR(S): Juan Torres-Rincon (University of Barcelona)
Vincenzo Greco (University of Catania)

SUPERVISOR(S) contact- email: torres@fqa.ub.edu Telephone: +34 934039396
email: greco@lns.infn.it Telephone:

UNIVERSITY/RESEARCH CENTER: University of Barcelona/University of Catania

ABSTRACT

(just few lines 5-10 explaining briefly the idea of the proposed work and the place where it will be developed).

The dynamics of heavy-flavor particles in a thermal medium can be described by the Langevin equation, which incorporated several transport coefficients as parameters. To be respectful with the special relativity principles, a recent study has considered a causal version of the Langevin equation which requires an additional coefficient, the memory time [1]. In this project, the nature of the memory time will be studied from microscopic interactions of heavy particles. By applying the theory of hydrodynamic fluctuations, this parameter will be extracted for realistic systems performing numerical simulations.

The work will be mainly developed at the University of Barcelona supervised by Juan Torres-Rincon and concluded at University of Catania guided by Prof. Vincenzo Greco.

[1] M.Ruggieri et al. Phys.Rev.D 106 (2022) 3, 034032