

Research Studentships (Master or Integrated Master students)

Applications are open for 1 (one) Research Studentship for PhD students, within the framework of (1801P.01414.1.01) CENTRA UIDB/00099/2025 - IST-ID, financed by national funds through FCT/MCTES (PIDDAC), under the following conditions:

Scientific Area: Astronomy and Astrophysics

Admission Requirements: *To be enrolled at an integrated master or a master.*

Workplan: This research aims to develop a first-principles analysis of the behavior of a body emitting dipolar electromagnetic radiation when orbiting a supermassive Kerr-type black hole.

The aim will be, at first, to establish the rigorous theoretical model that describes this system through an analysis based on black hole perturbation theory.

In a second phase, numerical computation of the results will be implemented to obtain quantitative predictions for different orbital and emission regimes. The results will then be compared with existing hotspot simulations, allowing us to assess the consistency between phenomenological approaches and first-principles deductions. Additionally, the study will allow us to explore relevant relativistic effects, such as the Doppler Shift, of direct interest to black hole astrophysics and potentially observable objects.

Legislation and Regulations: Statute of Scientific Research Fellow, approved by Law nr. 40/2004, of August 18, as worded by Decree-Law nr. 123/2019, of August 28; FCT Regulation for Research Studentships and Fellowships, available on <https://www.fct.pt/apoios/bolsas/docs/RegulamentoBolsasFCT2019.pdf> and <https://dre.pt/application/file/a/127230968>.

Workplace: The work will be developed in Dep. of Physics/CENTRA of Instituto Superior Técnico, under the scientific guidance of Professor Vitor Manuel dos Santos Cardoso.

Duration: The research fellowship(s) will have a duration of 4 months. It's expected to begin in November and may be eventually renewed.

Monthly maintenance allowance: According to the values for Research Fellowships awarded by FCT in Portugal (<https://www.fct.pt/fct-atualizou-o-valor-das-bolsas-para-2026/>), the amount of the monthly maintenance allowance is €1090,98, being the payment method an option of the Fellow by Wire Transfer/Check.

Selection methods: The selection methods will be the following: *Curriculum evaluation*, with the respective weight of 100%.

Composition of the selection Jury: Prof. Ilídio Lopes, Prof. Vitor Cardoso, Prof. David Hilditch.

Announcement/ notification of the results: The final evaluation results will be communicated to all applicants by email.

Deadlines and procedures of complaint and appeal. A complaint may be lodged from the final decision within 15 working days, or an appeal to the Executive Board of IST-ID within 30 working days, both counted from the respective notification

Application deadline and formalization: The call is open from October 10 until October 21, 2026.

It is mandatory to formalize applications with the submission of the following documents: i) B1 Form – Fellowship application (<https://ist-id.pt/recursos-humanos/bolseiros/#documentos-relacionados>); ii) *Curriculum Vitae*; iii) academic degree certificate, where applicable; iv) proof of enrollment at an academic degree course (Master, Integrated)



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Applications must be submitted to the email: [vitor.cardoso@tecnico.ulisboa.pt](mailto: ritor.cardoso@tecnico.ulisboa.pt)



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