



Barcelona, April 8th, 2021

I'm writing this letter of recommendation to support the application of Gerard Tort to the inter-university master of *Quantum Science and Technology* coordinated by the University of Barcelona.

As his tutor, I met Gerard right when he started his studies of Physics at the University of Barcelona, and I have been able to follow his trajectory during the last three and a half years. During this period, I have only had the opportunity to teach him the laboratory course on Modern Physics, which has allowed me to appreciate him as a very curious and participative student, who asks interesting questions in order to fully grasp the essence of the concepts explained. His assignments are being duly presented and show depth and maturity, demonstrating a high sense of responsibility in approaching his work and education.

The candidate is finishing his Physics degree with an average mark of 71/100 so far, which situates him between the top 20% of students in Physics at the University of Barcelona. I would like to emphasize that his grades have become higher than the average in the last years, excelling especially in the courses "Computer Sciences", "Nuclear and Particle Physics", and "Non-equilibrium systems", in which Gerard's accomplishments would situate him within the top 5%. In addition, he is presently following two elective courses ("Quantum Mechanics of N-body Problems and Ultracold Systems" and "Magnetism and Superconductivity") which will provide him with an excellent background to take full advantage from the courses of the Master of *Quantum Science and Technology*.

On the personal side, Gerard is a very enthusiastic and vital person, with initiative to establish connections that could benefit his education. He is also very respectful in his manners and very eager to help his student mates.

In summary, I very strongly recommend Gerard Tort to be accepted in inter-university master of *Quantum Science and Technology* coordinated by the University of Barcelona. I am sure that he will take good profit from this opportunity, given his good intellectual capacities, his excellent preparation in fundamental physics subjects, and his ability to work in a responsible and independent way.

Yours sincerely,

Àngels Ramos
Professor of Physics

Dear Members of the Selection Committee,

This letter is to support **Gerard Tort's** application for the **Master in Quantum Science and Technology**, coordinated by the University of Barcelona. In the following, I aim to justify why he is an **outstanding** candidate for this Master's programme.

I have over 15 years of academic experience in Spain, the US (Michigan State University) and the UK (Surrey, from 2009 to 2020), including 3 individual Research Fellowships (Marie Curie, STFC Advanced Fellowship and now Ramón y Cajal). I have taught at all levels in Physics bachelor's and master's degrees, and I have supervised 13 bachelor and 5 master thesis students at Surrey, as well as 5 PhD students. I will also teach the *Advanced Quantum Mechanics* module in the Master in Quantum Science and Technology in fall 2021 - so I think I am well placed to judge Gerard's potential in this Master's.

Gerard contacted me right after starting his final year of undergraduate, in October 2020. He was looking for a project that could feature quantum mechanics and theoretical physics – and took the **initiative** of contacting potential supervisors early on. After some discussion, we settled on a project interweaving neutron-star astrophysics with some exotic particle physics scenarios. In particular, he is looking at the effect of beyond-standard-model couplings between neutrons and electrons to neutron-star stability.

Gerard's project is exploring uncharted territory (eg it is an original research topic, with little available background and that is new even for me), but this hasn't hampered his progress. 6 weeks in, he has already developed all the necessary coding tools to carry on the project successfully. Let me stress this is no small feat: a **significant amount of work** is required to understand the basics of neutron star structure, including beta-equilibrium and the solution of the Tolman-Oppenheimer-Volkov equations. These are topics that I typically teach at a Master's level (within the Spanish Nuclear Physics MSc programme).

Gerard has also been very **meticulous**, keeping a well-written account of his progress, including generating several original, research-level plots. It is early days in the project but, if the bounds that he generates are competitive, the project may lead to a publication.

Gerard has performed extremely well so far in his project. I am particularly impressed by his ability to work with original ideas. In our discussions, he always brings relevant and conceptual physics questions which, to me, indicates a high degree of **maturity** and **physics expertise**. I note that these high-level, active learning cognitive abilities are not necessarily reflected in academic transcripts, which correlate with (different) exam-solving skills. Finally, I have read Gerard's statement and talked to him about this master's opportunity: he is extremely **motivated** and I am sure will contribute positively as a student. Please do not hesitate to contact me if you need any further information.

With best regards,

A handwritten signature in blue ink, appearing to read 'Arna', followed by a long horizontal stroke.

Dr Arnau Rios Huguet, 12 April 2021