

Sergio Sevillano Muñoz

PERSONAL INFORMATION

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EDUCATION & EXAMINATIONS

University of Cambridge Oct 2019 - Present
MASt in Applied Mathematics (Part III Maths)
Department of Applied Mathematics and Theoretical Physics

University of Nottingham *September 2016 - June 2019*
BSc. Physics with Theoretical Physics, First Class Honours
Distinction in Principle of Dynamics (97) and Theory Toolbox (99)
Overall Percentage: 86

Colegio San Pablo CEU, Madrid *September 2014 - June 2016*
Título de Bachillerato
Prueba de Acceso a la Universidad (PAU)
Overall Percentage: 97.5
Result: 12.5 out of 14

RELEVANT COURSEWORK

Relevant courses as part of the graduate program:

- Quantum Field Theory
- Statistical Field Theory
- Symmetries, Fields and Particles
- Cosmology
- General Relativity
- Field Theories on Cosmology
- Standard Model
- String Theory
- Black Holes
- Gauge/Gravity duality

INTERNSHIPS AND PROJECTS

Scalar Fields on Cosmology in 2019
The University of Nottingham
Supervisor: Prof. Edmund Copeland
2019

This 5-month work was the final year project of my degree. The purpose of this report was to test the validity of scalar fields with an exponential potential on a FLRW metric, given the recent discoveries on cosmology.

- Late time solutions for a universe containing a baryotropic fluid and a Scalar Field were studied. After finding the stability, another potential and fluid were added into the system. The combination of the stable solutions could model the inflationary aspect of our universe.
- The evolution of the fields and their respective Hubble diagrams were computed, agreeing with previous calculations.
- The implications of the Swampland Conjecture were applied on these fields, constraining even further the model developed in this report.

N-Body Problem and Gravitational Waves

The University of Nottingham

Supervisor: Prof. Frazer Pearce

November 2018

This 1-month project was part of a scientific computing module where I tried to simulate a N-body system with gravitational interactions using Matlab.

- The basis of the project consisted of recreating the Solar System dynamics. At this point, referring to Sean Carroll's book, I also incorporated relativistic effects in this model system by using perturbation methods. This let me compute the effect of gravitational waves on the eccentricity of the orbits.

Energy Bands of Bismuth using Tight Binding

Centro Superior de Investigaciones Científicas, Madrid.

Supervisor: Prof. Carmen Muñoz

Summer 2018

- During this internship I learned about the tight binding technique in Solid State Physics. By using the Slater-Koster parameters I wrote a program (Matlab) that calculated and reproduced the energy bands for both finite and infinite configurations of Bismuth.

Transparent and Conductive Films

Centro Superior de Investigaciones Científicas, Madrid.

Supervisor: Prof. Carlos Prieto

Summer 2017

- Internship on using the sputtering technique to create conductive thin films out of Fluor-Tin-Oxide and Argon. Properties with different ratios were studied and compared, finding interesting results on the quality of these kind of materials.

SCHOLARSHIPS & Sir Peter Mansfield Award

2017

WORK EXPERIENCE I was the recipient of the Science Award in The University of Nottingham. This was an annual grant given every year to students with excellent academic results in the first year of the degree in Physics.

Physics, Mathematics and Philosophy Tutor

September 2016-Present

Teaching is one of the aspects that I like most about learning. For that reason, I have been tutoring different high school students while studying for my degree. Moreover, every time I go back to Spain I help organise physics versus philosophy debates at my high school.

Member of San Pablo CEU Orchestra

Winter 2016- Present

Alongside studying, I have been playing drums and piano for the past 11 years. During high school, I was part of the school's orchestra, being the lead percussionist. Although I am no longer a member, I am in charge of the sound system for every official performance.

Main Role at the Theatre San Pablo CEU

2016

During my last year at high school I joined the theater group, where I learned to act in front of large audiences. At the end of the year we performed *Usted tiene ojos de mujer fatal* by Poncela.