**TO MAGNIFICO RETTORE OF UNIVERSITÀ DEGLI STUDI DI MILANO** **ID CODE 6606**

I the undersigned asks to participate in the public selection, for qualifications and examinations, for the awarding of a type B fellowship at **Dipartimento di fisica**

Scientist- in – charge: **Prof. Luigi Guzzo**

**Iñigo Saez Casares**

**CURRICULUM VITAE**

PERSONAL INFORMATION

| | |
|---|---|
| Surname | **Saez Casares** |
| Name | **Iñigo** |

PRESENT OCCUPATION

| Appointment | Structure |
|---|---|
| **PhD student in Astronomy and Astrophysics** | **LUTH, Université Paris Cité** |

EDUCATION AND TRAINING

| Degree | Course of studies | University | year of achievement of the degree |
|---|---|---|---|
| Degree | **Master's Degree in Physics** | **Université Paris Saclay** | **2022** |
| Specialization | | | |
| PhD | | | |
| Master | | | |
| Degree of medical specialization | | | |
| Degree of European specialization | | | |
| Other | **Bachelor's Degree in Physics** | **École Normale Supérieure Paris-Saclay / Sorbonne Université** | **2018** |

FOREIGN LANGUAGES

| Languages | level of knowledge |
|---|---|
| **Spanish** | **Native** |
| **French** | **Native** |
| English | C2 |
| **Basque** | **Intermediate** |
| **German** | **Beginner** |

AWARDS, ACKNOWLEDGEMENTS, SCHOLARSHIPS

| Year | Description of award |
|---|---|
| **2023-2024** | **HPC resources**, GENCI, 4 000 000 core hours on Joliot-Curie/Irene Rome, hosted by TGCC, France, estimated cost: 24 000 euros |
| **2022-2023** | **HPC resources**, GENCI, 6 000 000 core hours on Joliot-Curie/Irene Rome, hosted by TGCC, France, estimated cost: 73 800 euros |
| **2021-2022** | **HPC resources**, GENCI, 3 600 000 core hours on Joliot-Curie/Irene Rome, hosted by TGCC, France, estimated cost: 36 900 euros |

TRAINING OR RESEARCH ACTIVITY

**2021-2024** | **Ph.D research student in Astronomy and Astrophysics**, LUTH, Université Paris Cité, Meudon, Impact of modified gravity on large scale structure formation;

**2021** | **Research internship** (3 months), LUTH, Observatoire de Paris, Meudon, Large scale structure formation in modified gravity:

- Realization of cosmological simulations in f(R) gravity
- Building an emulator for the matter power spectrum

**2019-2020** | **Research internship** (9 months), University of Queensland, Brisbane, Weakly-coupled singlets mixing with the Higgs: astrophysical and cosmological constraints

- Study of a Higgs portal dark matter model, using different astrophysical and cosmological observations (stellar physics, X-rays, fifth forces, CMB) in order to constraint its parameter space
- Contribution to the GAMBIT code

**2019** | **Research internship** (4 months), Università Roma Tre, Rome, Two and three point correlation functions of the VIPERS galaxy survey

- Measuring the two and three point correlation functions of the VIPERS survey
- Modelling the measurements to extract the galaxy bias parameters
- Published in MNRAS

**2018** | **Research internship** (5 weeks), LPNHE, Paris, Forecasts for type 1a supernova cosmological analyses

- Generating realistic SNe 1a light curves sets using the SALT2 model
- Performing a joint fit of the light curve and cosmological parameters

**TEACHING EXPERIENCE**

**2021-2023**

**Teaching assistant**, Physics Department, Université Paris Cité, Paris

○ 2021-2023 (108h): Numerical projects, first year of Master's degree, in Python.

○ 2021-2022 (72h): Laboratory work: vibrations and waves, second year of Bachelor's degree.

CONGRESSES AND SEMINARS

**Talks**

- Conference (parallel session): **COSMO'23**, The e-MANTIS emulator: fast predictions of the non-linear matter power spectrum in f(R)CDM cosmology, Madrid, Spain (**September 2023**);
- Workshop: **GdR CoPhy - Tools WG**, The e-MANTIS emulator: fast predictions of the non-linear matter power spectrum in f(R)CDM cosmology, Paris, France (**June 2023**);
- Seminar: **IPhT cosmology seminar**, The e-MANTIS emulator: fast predictions for the non-linear structure formation in f(R) modified gravity, Gif-sur-Yvette, France (**June 2023**)
- Workshop (flash talk): **CoPhy GdR Kick-off**, An emulator for the non-linear matter power spectrum in f(R)CDM cosmology, Paris, France (**January 2023**)
- Seminar: **Paris Observatory Joint Galaxies and Cosmology Seminar**, Large-Scale Structure formation in modified gravity, Remote (**December 2021**)
- Workshop: **Action Dark Energy**, Building a matter power spectrum emulator from N-body simulations in f(R)CDM cosmology, Paris, France (**October 2021**)

**Posters**

- Meeting: **Euclid Consortium Meeting**, The e-MANTIS emulator: fast predictions of the non-linear matter power spectrum in f(R)CDM cosmology, Copenhagen, Danemark (**June 2023**)

- Conference: **Moriond Cosmology**, An emulator for the matter power spectrum in f(R)CDM cosmology, La Thuile, Italy (**January 2022**)

PUBLICATIONS

Articles in reviews

- **The e-MANTIS emulator: fast and accurate predictions of the halo mass function in f(R)CDM and wCDM cosmologies**. Iñigo Saez-Casares, Yann Rasera, Tamara R.G. Richardson, Pier Stefano Corasaniti. Submitted to A&A.

- **The e-MANTIS emulator: fast predictions of the non-linear matter power spectrum in f(R)CDM cosmology**. Iñigo Saez-Casares, Yann Rasera, Baojiu Li. MNRAS, 527(3), 7242-7262 - January 2024. arXiv:2303.08899

- **A joint 2- and 3- point clustering analysis of the VIPERS PDR2 catalogue at z ∼ 1: breaking the degeneracy of cosmological parameters.** Alfonso Veropalumbo, Iñigo Saez-Casares, Enzo Branchini et al. MNRAS, 507(1), 1184-1201 - July 2021. arXiv:2106.12581

OTHER INFORMATION

**COMPUTING SKILLS**

**Languages**

- Python: main developer of the e-MANTIS emulator, publicly available as a Python package. Experience analyzing thousands of cosmological simulations with Python. Supervise numerical projects in Python for undergraduate students.
- Fortran: modifications to the RAMSES cosmological code in order to compute the lensing potential in f(R) gravity, as well as the pFoF halo finder, both written in Fortran90.
- C++: contributed to the GAMBIT C++ code during my research experience at the University of Queensland.
- Bash: modify and write Bash scripts in order to submit in a automatic way hundreds of jobs in HPC centers, as well as to manage the very large number of produced data files.

**HPC**

Used more than 12 million cpu-hours on Tier-1 french national supercomputers running jobs with several hundreds of MPI tasks. Experience producing, postprocessing and managing several hundreds of terabytes of simulated data.

**Other software**

GNU/Linux, LATEX, Beamer

**OUTREACH**

**2021-2023**

**Science fair**, Paris Observatory, Paris, France, Yearly event aimed at primary school students. Building galaxies with LEGOs and visualizing hydrodynamical cosmological simulations with Virtual Reality headsets.

**RESPONSIBILITIES**

**Seminar co-organizer,** Paris Observatory Joint Galaxies and Cosmology Seminar, Online, Coorganizer

of a bimonthly online seminar from January 2022 until today.

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The present curriculum does not contain confidential and legal information according to art. 4, paragraph 1, points d) and e) of D.Lgs. 30.06.2003 n. 196.

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Place and date: Meudon, 06/05/2024