



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: **Luigi Guzzo**

**Martin Kärcher**

## CURRICULUM VITAE

### PERSONAL INFORMATION

|         |         |
|---------|---------|
| Surname | Kärcher |
| Name    | Martin  |

### PRESENT OCCUPATION

|               |                          |
|---------------|--------------------------|
| Appointment   | Structure                |
| PhD candidate | Aix-Marseille University |

### EDUCATION AND TRAINING

| Degree                            | Course of studies           | University               | year of achievement of the degree |
|-----------------------------------|-----------------------------|--------------------------|-----------------------------------|
| Degree                            | Bachelor of Science (B.Sc.) | University of Heidelberg | 2019                              |
| Specialization                    |                             |                          |                                   |
| PhD                               |                             |                          |                                   |
| Master                            | Master of Science (M.Sc.)   | University of Heidelberg | 2021                              |
| Degree of medical specialization  |                             |                          |                                   |
| Degree of European specialization |                             |                          |                                   |
| Other                             |                             |                          |                                   |



## FOREIGN LANGUAGES

|           |                          |
|-----------|--------------------------|
| Languages | level of knowledge       |
| German    | Native proficiency       |
| English   | Professional proficiency |
| French    | Elementary proficiency   |

## TRAINING OR RESEARCH ACTIVITY

### **2021 - present: PhD candidate at Aix-Marseille University**

During the work for my PhD project I am studying the connection between the large-scale structure of the Universe and the cosmological model alongside the underlying theory of gravity. In more detail, I am testing models describing the two-point correlation of the galaxies in simulations and explore marked statistics as a tool to improve the detection of modified gravity signatures. This will help in the future with large surveys like Euclid to unravel the mysterious nature of dark energy causing the accelerated expansion of the Universe.

## PROJECT ACTIVITY

| Year      | Project   |
|-----------|---|
| 2020/2021 | Master thesis: I investigated a specific kind of modified gravity in the light of accelerated solutions to the scale factor without the necessity of a cosmological constant. In addition, I explored the perturbations of the theory searching for instabilities and ghosts.       |
| 2019      | Bachelor thesis: I derived star-formation rates of galaxies from optical spectra taken with an integral field unit. Furthermore, I did a statistical comparison of the star-formation rates regarding the activity of the host galaxy's nucleus and the applied analysis technique. |



## CONGRESSES AND SEMINARS

| Date                          | Title   | Place               |
|-------------------------------|---|---------------------|
| 24-26 January 2024            | Euclid France symposium   | Lyon, France        |
| 6 December 2023               | Euclid welcome session  | Online              |
| 5-6 November 2023             | Colloque national Action Dark Energy 2023 - 7ème édition          | Annecy, France      |
| 19-23 June 2023               | Annual Euclid Consortium meeting                                  | Copenhagen, Denmark |
| 20-24 February 2023           | Euclid Consortium galaxy clustering science working group meeting | Milan, Italy        |
| 30 November - 2 December 2022 | Euclid France symposium   | Paris, France       |
| 24 November 2022              | Euclid France clustering meeting                                  | Marseille, France   |

## PUBLICATIONS

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| Articles in reviews   |
| Euclid Collaboration: M. Kärcher, M. A. Breton, S. de la Torre, et al., “Euclid preparation. TBD. Galaxy two-point correlation function modelling in redshift space”, in prep.  |
| M. Kärcher, J. Bel, S. de la Torre, “Towards an optimal marked correlation function analysis for the detection of modified gravity”, arXiv:2406.02504, submitted to Astronomy & Astrophysics                              |
| Euclid Collaboration: Y. Mellier, Abdurro’uf, J. A. Acevedo Barroso, et al. (including M. Kärcher), “Euclid. I. Overview of the Euclid mission”, arXiv:2405.13491, cleared for journal by Euclid editorial board          |
| Euclid Collaboration: A. Pezzotta, C. Moretti, M. Zennaro, et al. (including M. Kärcher), “Euclid preparation. XLI. Galaxy power spectrum modelling in real space”, arXiv:2312.00679, Astronomy & Astrophysics, 687, A216 |



## SKILLS

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|----------------------------------|
| Programming languages: Python, C |
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| Software: Mathematica, bash, Latex, Git, Vim |
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## MISCELLANEOUS

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| Part of the local organising committee for the DESI meeting in Marseille July 2024 |
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| Organising the journal club 'Cosmo Circle' at the LAM from 2022 to now |
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| Tutor for an exercise class of the lecture 'General relativity' at the University of Heidelberg 2021 |
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| Girl's day: Organising a day, in form of a small workshop online, during which girls can have a look into different jobs where women are belonging to an underrepresented group (22.04.2021) |
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| Tutor for practical lab courses at the University of Heidelberg from 2018 to 2020 |
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| Member of the German Physical Society from 2016 to now |
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Declarations given in the present curriculum must be considered released according to art. 46 and 47 of DPR n. 445/2000.

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.

Please note that CV WILL BE PUBLISHED on the University website and It is recommended that personal and sensitive data should not be included. This template is realized to satisfy the need of publication without personal and sensitive data.

Please DO NOT SIGN this form.

Place and date: Marseille France, 13th of September 2024