

**TENURE-TRACK FACULTY POSITION IN PHYSICS  
INSTITUTE OF PHYSICS, UNIVERSITY OF SÃO PAULO, BRAZIL**

**Announcement IF-65,2024**

**Announcement of an open tenure-track faculty position at the Institute of Physics, University of São Paulo, Brazil, Level MS-3, RDIDP (Full-time dedication to teaching and research) at the Mathematical Physics Department at the Institute of Physics, University of São Paulo.**

The Director of the Institute of Physics at the University of São Paulo, Professor Kaline Rabelo Coutinho, invites applications for a full-time tenure-track faculty position in the field of “**Cosmology**” to be appointed in 2025. Eligible candidates should have a Ph.D. and postdoctoral research experience. Applicants should possess an outstanding potential to establish an independent research program and a commitment to teach undergraduate and graduate courses in Portuguese, 2 years after appointment. This position comprises full-time dedication to research and teaching, level MS-3, RDIDP. Salary is **R\$15.498,97**, non-negotiable. The position nº **1262122** at the Mathematical Physics Department is open for applicants for 90 days, from **October 10th, 2024, at 12:01 a.m. to January 7th, 2025, at 11:59 p.m. (GMT 3, Brasília time)**. The following is the detailed description of the program for the examinations:

**Physical Cosmology I (4305292)** - Introduction to the standard cosmological model, review of General Relativity, cosmic expansion, thermal history, cosmological perturbations, structure formation, inflation, observational cosmology, dark matter and energy.

**Physical Cosmology II (4305299)** - Review of cosmology, dark matter, cosmic acceleration, dark energy models, cosmological perturbations and structure formation, observational techniques, introduction to astrostatistics, numerical techniques and simulations, modern topics

**Applications**

1. Applications must be submitted exclusively via the link <https://uspdigital.usp.br/gr/admissao> during the period stated above, informing his/her personal data and the Department for which he/she is applying, accompanied by the following documents:
  - I - Detailed Curriculum Vitae (.pdf), outlining his/her experience in the specific area of the opening, list of published papers, activities related to the field of application, a two years research project and any complementary information which enables assessing the merits of the applicant;
  - II - Proof of a PhD degree with national validity, or accredited by the Institute of Physics of the University of São Paulo;
  - III – For Brazilian male applicants, proof of discharge from military service;

IV - For Brazilian applicants, electoral discharge certificate or detailed certificate issued by the Electoral court less than 30 days before the start of the application period.

1.1. An applicant already appointed at USP is exempted from the requirements III and IV, if these requirements were met during his/her appointment.

1.2. Foreign applicants are exempted from the requirements III and IV, instead, he/she must submit a copy of the identity pages in the passport.

1.3. An appointed foreign applicant may only take office if holding a temporary or permanent visa, which grants to the holder permission to exercise remunerated activities in Brazil.

1.4. Upon registration, foreign applicants may submit a written request to take the application exams in English. The contents of the examinations conducted in English or in Portuguese will be identical.

1.5. Upon registration, applicants with disabilities or special needs must submit a request for the necessary conditions being provided during the examinations.

2. The General Committee of the Institute of Physics will judge and announce the formal acceptance of the applications.

2.1. The examination of the candidates will take place within 30 and 120 days, after the formal acceptance of the applications.

3. The examination of the candidates will consist of the following exams.

I) Analysis and public examination of the Curriculum Vitae – weight 4.

II) Teaching exam (public lecture on a subject within the topics described above) – weight 3.

III) Public examination of the research project - weight 3.

3.1. The list of eligible applicants will be published in the São Paulo State Official Gazette.

3.2. Candidates who arrive late to the exams will be ineligible to proceed.

## **PUBLIC EXAMINATION OF THE CURRICULUM VITAE**

4. The evaluation of the Curriculum Vitae includes a public examination graded by each member of the Committee.

Sole paragraph - The grading of the Curriculum Vitae must consider: I – the scientific, literary, philosophical, or artistic production; II - university teaching activities; III - services to the community; IV - professional or other activities, if applicable; V - degrees and university honors.

## **TEACHING EXAM**

5. The public Teaching Exam consists of a 40 to 60-min lecture on a topic drawn from a list of topics. The lecture will begin 24 hours after the drawing.

I – The Examining Committee will prepare and announce a list of ten topics within the program detailed above;



II – Immediately after becoming aware of the examination topics, candidates may ask to replace one or more topics they understand not belonging to the program. The Examining Committee will decide the claim and if necessary, substitute the topics under objection.

III – After drawing the topic, a 24-h period to prepare the lecture will start. The lecture will begin the next day, at the same time of the drawing. The candidate may not waive this deadline.

IV - Candidates may use and consult all materials he/she deems necessary.

## **PUBLIC EXAMINATION OF THE RESEARCH PROJECT**

6. The examination of the Research Project will be in the form of a dialogue: A short oral presentation of the project to the Committee (if asked for), up to sixty minutes questioning by the Committee and the same time, sixty minutes, for the answers of the candidate.

I - The Research Project, should consider its actual feasibility at the existing infrastructure of the Institute and must be framed within the field of the announcement.

## **GRADING**

7. After the exams, members of the Examination Committee will individually grade each candidate.
8. The grades may range from zero to ten, with one decimal place.
9. Each candidate will have a final grade given by each member of the Examination Committee. The final grade is calculated as a weighted average (according to the weights given in item 3) of the grades of each exam.

§ 1º - Differentiated score formula to be applied for candidates of Black, Mixed-race, and Indigenous ethnicities (PPI candidates):

$$PD = (MCA - MCPPI) / MCPPI$$

Where:

- PD is the differentiated score to be added to the grades of all candidates who expressed interest in participating in the differentiated score.
- MCA is the average score of the broad competition among all candidates, excluding those who did not reach the minimum score referred to in item 10 of this Edict and PPI candidates participating in the differentiated score.
- MCPPI is the average score among all PPI candidates, excluding those who did not reach the minimum score referred to in item 10 of this Edict.

§ 2º - The formula to account for the differentiated score in the final grades of PPI candidates is:

$$NFCPPI = (1 + PD) * NSCPPI$$

Where:

- NFCPPI is the final grade of the public examination, after applying the differentiated score. It will generate the candidate's classification in the public examination stage, limited to the maximum grade stipulated in the Edict. At the end of the public examination, the final grade will be considered the candidate's simple grade.

- NSCPPI is the simple score of the PPI candidate, on which the differentiated score will be applied.

§ 3º - The calculations referred to in §1 and §2 of this item must consider two decimal places and fractions greater than or equal to 0.5 (five-tenths) must be rounded to the next whole number.

§ 4º - The differentiated score (PD) provided for in this article applies to all qualified candidates, that is, those who have achieved the minimum performance established in the Edict, considering for this last purpose the simple score.

§ 5º - If there are no PPI candidates with differentiated score among those qualified, the differentiated score will not be calculated.

§ 6º - The differentiated score will not be applied when, in the differentiated score (PD) calculation formula, the MCPPI (average PPI competition score) is greater than the MCA (average broad competition score).

10. To be eligible, candidates must achieve a minimum final grade of seven from the majority of examiners. Each examiner will nominate the candidate he/she graded highest.
11. The candidate receiving most nominations by the Examination Committee will be indicated for appointment.
12. The Examination Committee will publicly announce the results of the examination immediately after its completion.
13. The effective appointment to the position depends on a medical examination conducted by the State's Department of Medical Skills (DPME), pursuant to article 47, VI, of Law No. 10.261/68.
14. Further information and relevant rules for the examination are available at the Academic Assistance Department of the Institute of Physics, University of São Paulo, and e-mail [ataac@if.usp.br](mailto:ataac@if.usp.br).

Legal provisions: Announcement IF-65, 2024, approved during the 610<sup>th</sup> Ordinary Session of the Institute of Physics Committee, held on 08/29/2024. Information 8373/24, Deliberation GR/Circ/109, art. 125, paragraph 1, of USP's General Regulations and by the Rules of the Institute of Physics: Resolutions No. 4,087 of June 21, 1994, 4,265 of May 3, 1996, 5,367 of October 18, 2006 and 5,829 of April 4, 2010. Authorization for taking exams in English: paragraph 8 of art. 135 of the General Rules. The joining to the faculty in the Full-Time Regime (RDIDP) is conditional upon the approval of the Special Work Regime Committee (CERT), in accordance with Resolution 7271/16 and other applicable rules, and implies in exclusive relationship with USP, under ARTICLE 197 of the General Rules.

São Paulo, September 9<sup>th</sup>, 2024.

**ANNEX – JUSTIFICATION FOR THE GRANTING OF THE FACULTY POSITION**



## **Cosmology**

The requested position refers to the replacement of Prof. Elisa Gouvêa Maurício Ferreira (active in the field of cosmology).

### **Current Situation of the Department/Area (Contextualization):**

The academic project of the Department of Mathematical Physics at IFUSP defines our mission as promoting the generation and dissemination of knowledge, as well as the training of human resources in the areas of greatest impact at the frontier of fundamental physics, where we aspire to be a center of excellence. We conduct research on topics that are at the forefront of knowledge and are internationally competitive. We have secured financial support from various funding agencies and host several research projects. Most of our faculty members hold Research Productivity Fellowships, a recognition of the quality of the research conducted, and are principal investigators in various projects. We are active in the fields of Cosmology, Elementary Particle Physics, Quantum Field Theory and String Theory, Mathematical Physics, and Heavy Ion Physics. We have played an active role in teaching at all levels, from the most basic to the most advanced courses, both at the undergraduate and graduate levels.

Cosmology plays a fundamental role in understanding the origin, evolution, and structure of the universe, and it is a field of intense research and academic interest. In particular, the field of cosmology is experiencing a surge of new data, with 3D maps of the universe that will revolutionize the field in the coming decade. Therefore, hiring a PhD professor in cosmology is essential not only to maintain the department's academic excellence but also to ensure the continuity of research, teaching, and the training of new researchers in this highly active and internationally impactful field of study.

### **- General Objective of the Faculty Hiring:**

The primary objective of hiring a new faculty member in the field of cosmology is to strengthen the faculty of the Department of Mathematical Physics, ensuring the continuity of teaching, research, and outreach in this crucial field of study. Additionally, the aim is to promote academic excellence, foster scientific production, and provide quality education to students, preparing them for the challenges and advancements in the field of cosmology. The new hire aims to keep the department up-to-date and competitive, contributing to the advancement of scientific knowledge and the training of skilled professionals engaged with current challenges.

## - INDIVIDUALIZED PLAN

### **a) Teaching - Goals (describe activities, indicators, and timelines):**

A newly hired faculty member could significantly contribute to the undergraduate teaching load at the Institute of Physics at USP, which has been greatly affected by various faculty losses in recent years. The new faculty member would also teach specialized graduate courses, enhancing the training of our students in a research area of fundamental importance. We also emphasize the importance of mentoring in Scientific Initiation, an activity strongly encouraged in our Department, which, together with research supervision at the graduate level (Master's and Doctorate), forms the foundation for training new scientific personnel.

### **b) Research and Innovation - Goals (describe activities, indicators, and timelines):**

In the realm of research and innovation, the established goals involve a set of strategic activities to promote the advancement of knowledge in cosmology. These include delivering lectures and practical sessions, supervising graduate students in their research projects, and continuously developing pioneering studies. Indicators will include the number and quality of scientific papers published in internationally renowned journals, securing funding for research projects, and participating in relevant academic events. These goals will be regularly monitored in line with the deadlines set for periodic evaluation by this University, aiming to ensure excellence in scientific production and the consolidation of the department as a reference in cosmology.

### **c) Culture and Outreach - Goals (describe activities, indicators, and timelines):**

The Department of Mathematical Physics has been highly successful in developing science outreach programs, such as the "Invitation to Physics," a series of colloquia aimed at disseminating various research areas and topics among undergraduate students and the general public, in addition to our faculty's participation in short courses and conferences. Other faculty members in the field of cosmology are also actively involved in outreach activities both within and outside USP, responding to the public's great curiosity about the field. A future hire could participate in these projects and initiatives not only as a speaker but also in the organization and curation of these events. Furthermore, they would have the opportunity and support from the Department to propose and carry out other outreach activities to disseminate scientific knowledge, which would be strongly encouraged by DFMA.

## **- EXPECTED IMPACT OF THE HIRING:**

Hiring a new faculty member in the field of cosmology is expected to boost the Department of Mathematical Physics, elevating its academic excellence and expanding research and teaching



opportunities. Increased scientific production is anticipated, with more publications in reputable journals and greater resource acquisition for projects. Moreover, the new faculty member's presence is expected to benefit student training and promote outreach activities that positively impact society. In summary, the hiring not only fills the gap left by the departing faculty member but also strengthens the department and contributes to the advancement of science and education in cosmology.

**a) Short, Medium, and Long-Term:**

The requested hiring will immediately fill the faculty gap in an important research line within the Department of Mathematical Physics at the Institute of Physics at USP, allowing for the consolidation of a research group similar to those at major international theoretical physics research institutions.