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

Announcement IF-40,2025

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 Applied 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 **"ATMOSPHERIC PHYSICS"** 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 **1083341** at the Applied Physics Department is open for applicants for 90 days, from **April 23th, 2025, at 12:01 a.m. to July 21st, 2025, at 11:59 p.m. (GMT -3, Brasília time)**. The following is the detailed description of the program for the examinations:

Physics II (4302112) - Harmonic, damped, forced, and damped-forced oscillations. Resonance. Basics of the theory of elasticity. Waves in elastic media. Wave reflection. Superposition of waves. Interference and diffraction. Beats. Confined waves. Properties of gases (ideal and real) and some relationships between macroscopic and microscopic quantities. First Law of Thermodynamics. Important concepts: Heat, Work, Internal Energy, and Enthalpy. Second Law of Thermodynamics. Important concepts: Entropy, Gibbs and Helmholtz free energy. Applications: engines/refrigerators.

Physics III (4302211) - Coulomb's law, electric field, Gauss's law, electrostatic potential, capacitance and dielectrics, electric current, magnetic field, Lorentz force, Ampere's law, Faraday's law, inductance, magnetic materials, circuits, Maxwell's equations in differential and integral forms.

Discipline: Introduction to Atmospheric Physics (4300345) - Physical structure of the atmosphere: vertical profiles of atmospheric pressure, temperature, humidity. Basic equations of the atmosphere. Coordinate system. Chemical composition of the atmosphere. Cycles of carbon, nitrogen, sulfur and halogens. Chemical reactions and photolysis processes in the atmosphere. Natural greenhouse effect. Greenhouse gases. Global warming and climate change. Paleoclimate reconstructions. Instrumental temperature records on the globe. Influence of solar variability, volcanoes and oceans on the climate. Human influence on the climate. Physicochemical properties of atmospheric aerosols. Aerosol size distribution by number, area and volume of particles. Urban, marine, continental and forest fire aerosols. Temporal and spatial variations of aerosol concentrations. Aerosol removal via dry and wet deposition. Optical properties of aerosols. Scattering and absorption of solar radiation by aerosol particles. Cloud formation processes. Cloud condensation nuclei. Growth of droplets in clouds. Interactions between aerosols and clouds. Solar radiation in the atmosphere. Blackbody radiation and radiation laws. Solar irradiance at the top of the atmosphere and at the Earth's surface. Absorption and scattering of radiation by gases and aerosols. Planetary radiative balance. Radiative transfer equation and two-flux

approximation. Satellites and remote sensing measurements for estimating quantities and properties of the atmosphere and Earth's surface.

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.

11. Each examiner will nominate the candidate he/she graded highest.

12. The candidate receiving most nominations by the Examination Committee will be indicated for appointment.

13. The Examination Committee will publicly announce the results of the examination immediately after its completion.

14. 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.

15. 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.

Legal provisions: Announcement IF-40, 2025, approved during the __th Ordinary Session of the Institute of Physics Committee, held on 03/27/2025. Decree GR 8644, 2025, 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, March 28th, 2025.

ANNEX – JUSTIFICATION FOR THE GRANTING OF THE FACULTY POSITION

Proposal for the Opening of a Professor Position at the Department of Applied Physics, following editorial approval at the Congregation on March 27, 2025, for the area of Atmospheric Physics

1) Current Situation of the Department/area (contextualization)

Hiring a professor in the area of Atmospheric Physics, at the Department of Applied Physics (DFAP) of the Physics Institute of USP (IFUSP), is important to boost research in an area of great relevance to society. Atmospheric Physics is a relatively recent area of research, having been driven by the emergence of global environmental problems, such as climate change and air pollution. The application of concepts, methods and technologies originating from the area of physics can contribute to the mitigation of these environmental problems, from an interdisciplinary perspective. The area of Atmospheric Physics provides physics professionals with numerous application possibilities, using experimental, computational or theoretical approaches.

Atmospheric Physics is a well-established area at DFAP, with intense scientific production, national and international visibility, and contribution to the training of human resources. The set of research in the area of Atmospheric Physics developed within DFAP has produced knowledge to support public policies, especially on topics related to the climate emergency, air pollution, and the Amazon rainforest. DFAP has laboratories and equipment for monitoring physical processes in the atmosphere, and is a national reference in terms of the physical and chemical characterization of atmospheric constituents. The laboratory has multi-user analytical equipment, such as an EDXRF (energy dispersive X-ray fluorescence) equipment, which serves several research groups at USP and other institutions in Brazil, allowing the development of a wide range of projects in the environmental area. To expand and intensify DFAP's work in the environmental area, it is essential to hire new professors for the area of Atmospheric Physics, who can contribute to incorporating new atmospheric monitoring technologies, both in situ and via remote sensing, or even develop and apply computational models of physical and chemical processes in the atmosphere.

2) General objective of hiring a professor

Continue the ongoing renewal of IFUSP by updating the Atmospheric Physics area, seeking independent researchers with a leadership profile and international competitiveness, who are capable of interacting with the research groups already active in the unit, where there is a favorable environment for integration and inter and multidisciplinary efforts. Contribute to increasing the visibility and impact of research at IFUSP, considering that the Atmospheric Physics area receives great attention and resources inside and outside the university due to the relevance and urgency of environmental problems. Contribute to the renewal of IFUSP's faculty, teaching fundamental subjects for undergraduate and graduate education. Contribute to expanding university extension activities at IFUSP, considering that applied research in the environmental area has great relevance for society.

Specific Plan

a) Teaching - Goals:

The person hired is expected to take responsibility for undergraduate and graduate courses, progressing to a prominent role in the training of human resources. In the area of undergraduate teaching, the person hired must be directly involved in teaching activities in the Bachelor's Degree in Physics, Medical Physics or Degree in Physics courses offered by IFUSP, or in the Physics courses offered in the various courses at other USP units. This has been the rule within IFUSP, given the generalist training in physics of the professors. In addition, there are specific undergraduate and/or graduate courses linked to the area of the hiring, such as Introduction to Atmospheric Physics, which must have direct involvement of the professors who work in the area of the competition. Thus, the person hired will be responsible for classes in theoretical and/or experimental subjects that may, depending on demand, be entirely under their direct responsibility, a typical situation for the most advanced subjects in undergraduate courses, from the third to the fifth year. They may also work under the supervision of a team, in the case of subjects with multiple classes, such as basic physics subjects, typical of the first two years. As professional development progresses, they may move on to coordinating these subjects. Pedagogical improvement throughout the career is very important and, in addition to traditional lectures, modern pedagogical initiatives that stimulate student learning and development are expected.

Teaching at the graduate level is also strongly encouraged. IFUSP faculty members regularly teach courses at the graduate level, alternating or concurrently with their undergraduate teaching load. Training human resources is a goal for new faculty members at IFUSP from the very beginning. Thus, newly hired faculty members are encouraged to immediately join one of the graduate programs, where they will be expected to supervise master's and/or doctoral students. At the undergraduate level, supervising students in scientific initiation, teaching and extension projects is a natural consequence of the other activities. Thus, the person hired is expected to supervise undergraduate and graduate students, training qualified personnel, committed to ethical principles and to the commitments of science to society.

b) Research and Innovation - Goals:

Newly hired faculty members are expected to work on obtaining financial resources from state, federal and international research funding agencies to develop the research project presented immediately after being hired, which must be consistent with the one presented in the competition. While maintaining their academic independence, the new faculty member may join existing research groups at IFUSP, whenever possible, counting on the support of the technical staff and the cooperative effort to ensure a physical space suitable for the development of their projects.

The impact of the research developed is directly analyzed by scientific production, with publications of articles in journals in the top quartile of the area of activity of the main indicators (Clarivate, Scimago, Scopus), a requirement emphasized by our Postgraduate Program in Physics. Another highlight is innovation, which can be measured by obtaining patents, high-quality technological products and interaction with sectors outside the Academy.

Internationalization is an essential issue. Dynamic integration with institutes abroad is recommended, fostered by support for international cooperation, encouraging the establishment of partnerships. For faculty members who do not have international experience prior to hiring, this experience is encouraged through a post-doctoral internship abroad.

Therefore, it is expected that newly hired faculty members will seek academic independence, with the capture of financial resources by proposing challenging research projects to funding agencies. Additionally, it is expected that they will develop leadership in the area, seeking national prominence and international visibility, and that they may evolve to lead research teams.

c) Culture and Outreach - Goals:

University outreach is a tradition at IFUSP, as demonstrated by the activities developed by members of research groups. Examples of these activities are: working in schools/workshops for high school teachers; working in activities for the general public, held in spaces at IFUSP itself or in public spaces; participating in existing extension projects such as the Physics Show, the Demonstration Laboratory, the USP Fair of Professions, etc., or even engaging in their own initiatives, such as lectures or bibliographic production in scientific dissemination.

The person hired will have access to a productive environment to develop their outreach activities, mainly in the area of science dissemination and support for the teaching of Physics. In addition, partnerships established with companies, in the development of products and projects, are also encouraged, with cooperation agreements already signed, which demonstrate to those who join another path to directly meet the demands of society.

It is therefore expected that the person will work directly in the return of innovations to society. It should contribute to the dissemination and education of the lay public. It is also expected that it can train qualified personnel to meet the challenges that society proposes.

3) Expected Impact of Hiring:

Ensure the regular offering of essential courses in the area of Physics, as well as any other course offered by IFUSP in its undergraduate and graduate courses. At the same time, the development of research projects in an independent and self-financed manner is expected, producing new scientific knowledge and disseminating it to society.

In the medium term, the person hired is expected to propose graduate courses aligned with their developed research projects, enriching the academic curriculum of the institute. In addition, the person hired is expected to supervise master's students, contributing significantly to IFUSP's graduate programs. It is also expected that the hiring will result in the expansion of scientific collaborations, both within IFUSP and with external groups, including international partnerships. Additionally, participation in administrative activities is also expected, as a member of Boards, Committees and Congregation.

In the long term, it is expected that the strengthening of research in applied Physics in the environmental area will foster interdisciplinary projects that produce knowledge that is relevant to society, with the

potential to support public policies and increase the visibility of research developed at IFUSP. In the long term, the person hired is expected to play an important role in the training of high-level human resources, teaching and coordinating teams in disciplines, guiding doctoral students and supervising post-doctoral students. In the area of Culture and Outreach, the professor is expected to actively participate in activities already established at IFUSP, in addition to engaging in their own initiatives, such as lectures, bibliographic production in scientific dissemination, and other outreach activities. In addition, greater participation in administrative activities is also expected, such as course coordination and vice-coordination, Committee Presidency and vice-presidency, Department Heads and vice-heads, among others.