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

Announcement IF-56,2025

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 Department of Materials Physics and Mechanics.

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 **Experimental area of Physics and Materials Science** 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$16,353.01**, non-negotiable. The position nº **1263609** at the Department of Materials Physics and Mechanics is open for applicants for 90 days, from **July 16th, 2025, at 12:01 a.m. to October 13th, 2025, at 11:59 p.m. (GMT 3, Brasília time)**. The following is the detailed description of the program for the examinations:

Introduction to Solid State Physics (4300402: Crystalline structure. X-ray diffraction and reciprocal lattice. Crystalline bonds. Lattice vibrations, phonons, and thermal properties. Fermi gas of free electrons. Energy bands. Semiconductors. Metals and Fermi surfaces. Optical processes. Magnetism. Superconductivity.

Quantum Physics (4302311): 1. Evidence for an atomic description of matter. 2.Experimental evidence for the quantization of electromagnetic radiation: the black body problem, specific heat of solids, photoelectric effect, Compton effect, production and annihilation of the electron-positron pair. 3. The Rutherford model and the problem of atomic stability, the Bohr model. 4. The wave-particle duality in the case of electromagnetic radiation. X-ray and electron diffraction. The Broglie hypothesis and wave-particle duality. 5.Postulates of Wave Quantum Mechanics. 6. Wave packets, group velocity, and uncertainty relations. 7.The one-dimensional time-dependent Schrödinger equation. Discussion of some stationary solutions of the Schrödinger equation with one-dimensional constant potentials. 8. The Schrödinger equation in three dimensions. Particle in the cubic box. Degeneration. 9. The Schrödinger equation for central potentials and the radial solution of the hydrogen atom in quantum mechanics.

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.
3.3. The candidate will be disqualified from this examination, without prejudice to any applicable legal sanctions, if, at any time:
a) they arrive after the established time for the beginning of the examination proceedings or any of the tests, including for the drawing of points;
b) they behave in an inappropriate manner or disrupt the tests or any other stages of the examination, disturbing the proceedings, whether through verbal expressions or conduct incompatible with the integrity and tranquility of the environment;
c) they carry a firearm at the examination site, even if they have legal authorization for its possession, except in exceptional cases provided for by law and expressly authorized by the Judging Committee.

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 examinersEach 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 Division Department of the Institute of Physics, University of São Paulo, and e-mail ataac@if.usp.br.

Legal provisions: Announcement IF56, 2025, approved during the 621th Ordinary Session of the Institute of Physics Committee, held on 06/26/2025. Information GR 8787/2025, 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, July 7th, 2025.

ANNEX – JUSTIFICATION FOR THE GRANTING OF THE FACULTY POSITION

Current Situation of the Department/Area

The area of Experimental Physics and Materials Science holds a central role in the scientific, technological, and interdisciplinary development of the Institute of Physics at the University of São Paulo (IFUSP). It is essential to numerous research and innovation projects, with direct impact on various lines of investigation involving the synthesis and characterization of functional materials.

In recent years, the retirement of faculty members specialized in materials synthesis has significantly diminished the Institute's installed capacity for teaching, research, and academic supervision in this domain. Nevertheless, IFUSP retains a modern and diverse array of equipment, including furnaces operating under a wide range of temperatures and pressures, deposition systems such as Molecular Beam Epitaxy (MBE), and facilities for magnetic, thermal, optical, and electrical characterization. Moreover, laboratory spaces have recently been restructured to accommodate and support incoming faculty members.

The existing infrastructure enables the synthesis and analysis of semiconductor, superconductor, magnetic, and quantum materials, as well as radiation detectors and thin films. These resources are actively employed in both internal and external collaborations. The proposed faculty hire aims to renew the academic staff and strengthen a robust environment for research and innovation, thereby maintaining IFUSP's leading position in this strategically important field.

General Goal

The primary objective of this hire is to strengthen the area of Experimental Physics and Materials Science, particularly with regard to the synthesis of novel materials in various forms and their characterization. The selected faculty member will contribute to the advancement of frontier research, the modernization of the experimental infrastructure, the training of highly qualified personnel, and the expansion of the Institute's engagement with technological, industrial, and innovation-oriented initiatives.

It is expected that the new faculty member will work in close collaboration with IFUSP's existing academic staff, developing independent research projects, fostering interdisciplinary scientific progress, and helping to consolidate the structure of a central synthesis laboratory. This facility will provide both technical and scientific support to multiple research groups within the institution.

INDIVIDUALIZED PLAN

a) Teaching - Goals

The appointed faculty member will engage in undergraduate and graduate teaching, contributing to the offering of both core and specialized courses within IFUSP's academic programs. They will also be expected to propose new courses related to materials synthesis and characterization, phase diagrams, magnetic and semiconductor devices, and radiation detectors, thereby strengthening the technical and scientific training of students.

There is currently an unmet demand for advanced experimental courses, both in the undergraduate Physics major and in the graduate programs. The new faculty member will be expected to address this demand and to create opportunities for student training in state-of-the-art techniques, including those available at major national scientific facilities such as SIRIUS (LNLS/CNPEM).

From the outset, the faculty member is also expected to engage in the supervision of undergraduate research, as well as master's and doctoral theses, fostering a high standard of academic training with a strong emphasis on experimental and technological activities.

b) Research and Innovation - Goals

The field of Experimental Materials Science is highly dynamic and interdisciplinary, encompassing a broad range of materials, from intermetallic and quantum systems to oxides, hybrid materials, polymers, and nanomaterials. The appointed faculty member is expected to engage in both basic and applied research, with an emphasis on innovation and technological impact.

They are expected to propose ambitious scientific projects and to actively seek research funding from national and international agencies. Scientific output should be consistent and published in high-impact international journals, ideally complemented by patent applications and the development of technological prototypes or products.

The faculty member will have the opportunity to collaborate with existing research groups at IFUSP, particularly those with complementary infrastructure for materials characterization, thereby enhancing institutional synergy and contributing to the advancement of multidisciplinary research.

c) Culture and Extension - Goals

IFUSP has a longstanding tradition of outreach and science communication activities. The newly appointed faculty member is expected to participate actively in such initiatives, including colloquia, visitor programs, and efforts to promote science among the general public and high school students.

In addition to these established activities, the faculty member is encouraged to introduce new proposals aligned with their area of expertise. Expertise in materials synthesis, for example, may be extended to technical training programs, the development of educational materials, or collaborations with industry and international organizations.

Engagement with companies and research institutions may further enhance the social impact of the faculty member's work, fostering innovation and the transfer of knowledge and technology.

EXPECTED IMPACT WITH THE HIRING

a) Short, medium, and long terms:

Considering the temporal scope, we could anticipate the following impacts:

Short term: Installation and initiation of research lines related to the synthesis and characterization of novel materials, with rapid integration into IFUSP's existing infrastructure. Commencement of teaching activities and supervision of undergraduate and graduate students.

Medium term: Strengthening of internal and external collaborations, expansion of scientific output, and active involvement of students in interdisciplinary research projects. Consolidation of newly developed courses and enhancement of hands-on training in advanced experimental methodologies.

Long term: Establishment of a strong institutional reference in the field of materials synthesis and characterization, with significant impact in terms of scientific publications, training of highly qualified personnel, and technology transfer. Increased interaction with industry, the proposal of new innovation-oriented projects, and the enhancement of IFUSP's national and international visibility in the field of Experimental Materials Science are also expected.