

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

Announcement IF-69, 2019

**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 General Physics Department.**

The Director of the Institute of Physics at the University of São Paulo, Professor Manfredo Harri Tabacniks, invites applications for a full-time tenure-track faculty position in the field of **“Theory of strongly-correlated systems in condensed-matter physics”** to be appointed in 2020. 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\$11.069,17, non-negotiable. The position nº **1234978** at the General Physics Department is open for applicants for 90 days, from **December 18<sup>th</sup>, 2019, at 12:01 a.m. to March 16<sup>th</sup>, 2020, 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):** Crystal structure. X ray diffraction and reciprocal lattice. Crystal binding. Crystal vibrations, phonons and thermal properties. Free electron Fermi gas. Energy bands. Semiconductor crystals. Metals and Fermi surfaces. Optical processes. Magnetism. Superconductivity.

**Quantum Mechanics I (4302403)** - 1. General Structure of Quantum Mechanics. 2. Operator methods and two level systems. 3. The Schrödinger equation in three dimensions. 4. Central potentials. Angular momentum. Hydrogen atom. 5. Spin. Identical particles. Pauli exclusion principle. 6. Time-independent perturbation theory and applications.

**Statistical Mechanics (4302401):** 1. The Laws of Thermodynamics. 2. Notions of probability. 3. Micro-canonical ensemble. Boltzmann entropy. 4. Canonical ensemble. Maxwell velocity distribution. Partition function and connection with thermodynamics. 5. Einstein theory of specific heat in solids. Monoatomic ideal gas. Gibbs paradox. Diatomic ideal gas. 6. Photon gas, thermal radiation. Phonon gas, linear chain, Debye theory. 7. Grand-canonical ensemble. Bose-Einstein and Fermi-Dirac distributions. 8. Free electron gas, electronic thermal capacity. 9. Gases and liquids, configuration integral, second virial coefficient, Van der Waals theory.

### Applications

1. Applications must be submitted exclusively via the website <https://uspdigital.usp.br/gr/admissao> during the period stated above. Applicants must download, sign and submit the available application

form addressed to the Director of the Institute of Physics, containing his/her personal data and the Department for which he/she is applying, accompanied by the following documents:

- I - Detailed Curriculum Vitae outlining his/her experience, list of published papers, academic activities, and any complementary information that enables assessing the merits of the applicant in the specific field of this announcement, and associated documents proving the information provided;
- II - Proof of a PhD degree valid in Brazil, 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, copy of voter identification card;
- V – For Brazilian applicants, proof of vote in the last election (both turns), or proof of payment of the respective fine, or proper justification.

- 1.1. A foreign applicant, who has not done the official validation of his/her diplomas in Brazil, must write to the president of the Graduate Commission ([cpqusp@if.usp.br](mailto:cpqusp@if.usp.br)) asking for a temporary accreditation document to be issued by the director of the Physics Institute. This procedure may take several weeks. No application will be accepted without an accredited PhD title.
- 1.2. It is the solely responsibility of the applicant to verify the integrity of the uploaded files.
- 1.3. An applicant already appointed at USP is exempted from the requirements III, IV and V, if these requirements were met during his/her appointment.
- 1.4. Foreign applicants are exempted from the requirements III, IV and V. Instead, he/she must submit a copy of the identity pages in the passport.
- 1.5. 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.
- 1.6. 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.
- 1.7. 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 two-stage examination of the candidates will consist of the following exams.

1st stage (eliminative): a written exam on one of the topics described above – weight 3.

- 2nd stage:
- i) Analysis and Public examination of the Curriculum Vitae – weight 4.
  - ii) Teaching exam (public lecture on one of the topics described above) – 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.

**First phase: WRITTEN EXAM (Excluding)**

- 4. The written exam will consist of general and theoretical subjects.
  - I – based on the program described above, the Examining Committee will prepare a list of ten topics at the beginning of the examination and make it public.
  - 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 – At least 24 hours later, one topic will be drawn from the announced list, to become the subject for the written exam. The 5-hour non-extendable period of the written exam starts immediately after the drawing.
  - IV – during the first hour of the exam period, candidates may look up books, journals, and other bibliographical documents, and take notes.
  - V – the notes must be taken on paper sheets signed by the Committee and must be handed in attached to the corresponding exam.
  - VI – copies of the exam will be supplied to the members of the Committee. The exam will be read loud by the candidate in a public session.
  - VII – the exams will be graded individually by the members of the Examining Committee.
  - VIII – candidates who achieve a minimum grade of seven, from the majority of the examiners, will be considered qualified for the 2<sup>nd</sup> phase.
  - IX – the Examining Committee will present the grades given to the candidates in a public session.
- 5. Only candidates approved in the first phase will be allowed to participate in the second phase.

**Second phase: PUBLIC EXAMINATION OF THE CURRICULUM VITAE  
AND TEACHING EXAM**

**PUBLIC EXAMINATION OF THE CURRICULUM VITAE**

- 6. The evaluation of the Curriculum Vitae includes a public examination and will be 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**

7. 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.

## **Second Phase grading**

8. After the exams, each candidate will be individually graded by members of the Examination Committee.
9. The grades may range from zero to ten, with one decimal place.
10. 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.
11. To be considered eligible, candidates must achieve a minimum final grade of seven from the majority of examiners.
12. Each examiner will nominate the candidate he/she graded highest.
13. The candidate receiving most nominations by the Examination Committee will be indicated for appointment.
14. The result of the examination should be announced publicly by the Examination Committee, immediately after its completion.
15. 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.

16. 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-69, 2019, approved during the 560<sup>th</sup> Ordinary Session of the Institute of Physics Committee, held on 11/29/2019. Decree GR 7512, 2019, 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, December 13<sup>th</sup>, 2019.