



SPRACE

Postdoctoral Positions with the SPRACE group

SÃO PAULO, BRAZIL

Thiago R. F. P. Tomei

**We do not hire skilled people and motivate them.
We hire already motivated people and inspire them.**

(after Simon Sinek)

Introduction

The São Paulo Research and Analysis Center (SPRACE) is opening postdoctoral positions for outstanding research fellows to work in association with the UNESP group on the Compact Muon Solenoid (CMS) experiment of the CERN Large Hadron Collider (LHC). Grant funds are provided by FAPESP, the São Paulo Research Foundation.

The SPRACE research team is engaged in two CMS physics analysis groups: Exotic physics (Beyond the Standard Model) and Heavy Ion physics. SPRACE also operates a WLCG Tier-2 cluster and is responsible for the implementation of a state-wide grid infrastructure, GridUNESP, which serves more than 100 research groups from different scientific communities. SPRACE is also involved in R&D activities on the conceptual design, simulation and proof-of-concept of the data acquisition (DAQ) electronics of the outer tracker detector of the CMS experiment.

Research Topics of Interest

Data analysis activities in CMS

- ❑ Dark matter searches
- ❑ High-density nuclear matter

Phenomenological studies

- ❑ Hadrons under extreme conditions

DAQ Systems for Particle Detectors in HEP Experiments

- ❑ OpenIPMC: [2022 JINST 17 C03007](#)

Machine Learning applied to HEP

- ❑ Evaluation of Generative Models in HEP: <https://arxiv.org/abs/2211.10295>

List of Members of the Research Group

Prof. Sergio Novaes – Group Leader

- ❑ Search for dark matter in proton-proton collisions
- ❑ e-science and machine learning techniques associated to HEP

Prof. Eduardo Gregores – Deputy Group Leader

- ❑ Coordination of SPRACE CMS engineering group

Prof. Gastão Krein

- ❑ Theory projects and activities related to the strong interaction

Prof. Pedro Mercadante

- ❑ Coordination of SPRACE CMS BSM physics group

Prof. Sandra Padula

- ❑ Coordination of SPRACE CMS Heavy Ions physics group

Prof. Thiago Tomei

- ❑ Search for dark matter in proton-proton collisions
- ❑ High-level Trigger in CMS
- ❑ Machine Learning techniques associated to HEP

Prof. Cesar Bernardes

- ❑ Studies of physics in heavy ion collisions.

Activities

The candidates directly involved in the CMS experiment are expected to have a Ph.D. in Experimental High Energy Physics. A previous experience in one of the LHC experiments is an important asset. She/he should have the ability to carry out independent research in HEP and carry out physics analyses related to those of interests to the SPRACE group, and must:

- Help to comply with our responsibilities in the collaboration.
- Interact with different HEP groups worldwide.
- Travel to CERN (whenever possible) to work on site.
- Support and advise interns and students in the project.

Deliverables

For the CMS positions:

- At least one full-fledged analysis with Run-3 data.
- Heavy involvement in the service activities.

For the theory position:

- At least two papers on refereed journals.

Other information (1)

Location: São Paulo, Brazil

- ❑ The monthly income is fixed by FAPESP and nowadays is R\$ 8.479,20. In addition to the income, the candidate will receive:
 - Travel ticket to/from São Paulo
 - Installation aid corresponding to one month of salary
 - 15% of the yearly income to cover expenses with traveling, participation in conferences, equipment, etc.
- ❑ Missions to CERN / participation in conferences / shifts expected!

Other information (2)

Potential collaboration with other institutes

- CERN (Trigger, ML)
- Ohio State University (Dark Matter)
- Rice University, University of Illinois at Chicago (Heavy Ions)

Appointment Period

- These appointments are initially for 2 (two) years and it could be extended up to 4 (four) years, depending on the results of midterm evaluation carried out by a committee from the funding agency.

How to apply

SPRACE is committed to the principles of equal opportunity and affirmative action. Applications from any sexual orientation and members of minority groups are encouraged.

Please provide an application letter, résumé of work experience, and at least two letters of recommendation to cms@sprace.org.br.



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Thank you!

CMS@SPRACE.ORG.BR