OFERTAS DE TESIS EN FISICA EXPERIMENTAL:

"Three-photon processes in pp collisions collected with the ATLAS detector"
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The high-energy physics group at UAM participates in the ATLAS experiment at the LHC at CERN (Geneva). The group has a vast experience in precision measurements of the Standard Model, grid computing and the construction of the electromagnetic calorimeter of the ATLAS detector.

The proposed topic of this PhD is the measurement of three-isolated photon production at the LHC with partial data collected during Run-3. The process was measured by the ATLAS collaboration at a center-of-mass energy of 8 TeV and, since then, several developments in the computation of higher-order corrections in perturbative QCD have appeared in the literature that will be confronted against the measurement. This process is the main irreducible background to Higgs production in the diphoton decay channel in association with an additional photon (H+gamma). The experience obtained in the modeling of the three-photon background will then be used to study the prospects of a H+gamma search in the Higgs to diphoton channel with the full Run-3 dataset and its interpretation in terms of Effective Field Theories.

The work of the PhD candidate will be complemented with additional tasks in other groups of the collaboration. Some possibilities are: combined performance groups for the identification and calibration of the different physics objects, physics modelling group, simulation group or a more detector-oriented work.

Previous experience with statistical data analysis in C++ or python programming languages and Monte Carlo event generation will be positively valued.

Several Ph.D. positions are offered in high-energy experimental particle physics with the group at the department of Theoretical Physics. The high-energy physics group at the Universidad Autónoma de Madrid is an active member of the ATLAS Collaboration and has constructed a wheel of the electromagnetic end-cap. A Tier-2 Grid node is located in our premises. The group has a leading role in physics analysis in the Standard Model and Top groups of the ATLAS Collaboration. The successful candidate has the possibility of choosing the topic of his/her thesis within the diverse topics covered by the scientists working in the group, such as photon, jets and top physics.

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