M2R training, year 2021-2022

Phenomenological study: Searching for new resonance at the LHC

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Subject

Our understanding of the infinitely small is based on the Standard Model of particle physics. However, this model has some gaps that different "extensions" aim to fill. Some of them (supersymmetry, extra-dimensions, ...) predict new particles, such as new Higgs bosons, decaying into top quarks pairs. This internship in the ATLAS-LPC team proposes to use this remarkable signature to train the student in data analysis and Monte Carlo simulation.

The ATLAS-LPC group has a deep knowledge of top quark physics and the search for top-antitop resonances. Within this team, and in collaboration with Benjamin Fuks, theorist at the LPTHE (Sorbonne Université, Paris), the student will perform a phenomenological analysis to validate a new very generic top-antitop resonance simulation model. The objective of the internship is that this validation can be included in an upcoming scientific publication describing the model and the associated phenomenology.

The possibility of a thesis topic in the continuity of this internship will be discussed with the student.