

## The unbearable lightness of the Higgs

New quarks are a trendy alternative to solve the naturalness problem of the Standard Model (SM). But, as it happens with all the proposed theories beyond the SM, they lack any experimental evidence, and limits on the masses of hypothetical new quarks are more and more constraining [\[Press release\]](#). Searches for new quarks at the Large Hadron Collider (LHC) are made based on some (reasonable) assumptions, for instance about flavour, or about their allowed decay modes. But, might it be the case that these assumptions do not hold? To evaluate the impact of these assumptions in new quark searches is the topic of the present Master Thesis.

The student carrying out this Thesis will learn phenomenology of physics beyond the SM and will perform calculations for production and decay of new quarks, including Monte Carlo simulations for the LHC. The results will likely be published in a refereed journal and it may be used for the interpretation of future searches at the LHC.