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Characterizing New physics with Polarized Beams at High-Energy Hadron Colliders

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Motivations

- Status of New Physics searches at the LHC
- Why using polarized beams for New Physics searches?
- Future Accelerators & Polarized beams

Physics at polarized hadron colliders

- Polarized Parton Distribution Functions
- Parton luminosities & cross sections
- Longitudinal spin asymmetries

Physics case: Monotop signature

- Monotop production in the Standard model
- Monotop production in the RPV-MSSM
- Monotop production in the Hylogenesis model
- Monotop production in the X-model

Conclusions

Summary

If new physics has to be discovered in the forthcoming years, the ultimate goal of the high-energy physics program will consist of fully characterizing the newly-discovered degrees of freedom in terms of properties such as their masses, spins and couplings.

I will show how the availability of polarized beams at high-energy proton-proton colliders could yield a unique discriminating power between different beyond the Standard Model scenarios giving the same final-state signature, and how polarized beams could be help us to obtain information on the parameters of the hypothetical new physics sector of the theory. I will discuss as an illustrative example the case of a particular class of models leading to monotop production, and explain how these models could be distinguished by means of single- and double-spin asymmetries in polarized collisions at a Large Hadron Collider operating at a center of-mass energy of 14 TeV and at the recently proposed Future Circular Collider.

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