

## Physics Opportunities at Colliders

*Thursday, 30 October 2025 10:50 (30 minutes)*

Colliders, as powerful instruments at the energy frontier, provide unique opportunities to advance particle physics. They enable both direct searches for new resonances and indirect probes of physics beyond the Standard Model through precision measurements. In this talk, I will use sterile neutrino physics as a case study to illustrate these capabilities. I will present their discovery potential at the LHC and future lepton colliders, highlighting the complementarity between hadron and lepton machines. Finally, I will discuss recent advances demonstrating how future lepton colliders can distinguish the Dirac or Majorana nature of sterile neutrinos, showcasing their unique role in probing fundamental properties of new particles.

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