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Vector-like quarks: status and new directions at the LHC

LHC searches for vector-like quarks have so far only considered their decays into Standard Model particles. However, various new physics scenarios predict additional scalars, allowing vector-like quarks to decay into new channels. These new channels reduce the branching ratios into Standard Model final states, significantly impacting current mass bounds. In this talk, I will review the post-Moriond 2024 status of these models in light of available LHC data. I will demonstrate the relevance and observability of single and pair production processes of vector-like quarks, followed by decays into both standard and exotic final states. I will highlight the importance of large widths and the relative interaction strengths with Standard Model particles and new scalars. Finally, I will discuss potential future strategies to enhance the scope of vector-like quark searches, with illustrative examples.

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Collider and BSM Physics

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