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Composite quark partners in composite Higgs models at LHC

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Composite Higgs models represent an attractive extension of the Standard Model of particle physics, providing a solution to the hierarchy problem. The Higgs-like particle is realized as a bound state of a strongly coupled sector. This implies the existence of further bound states at the TeV scale, which can be searched for at the LHC. In this talk we focus on the composite quark partners, i.e. fermionic SU(3) charged states which mix with the Standard Model quarks. We show how the partners of the first, second, and third family quarks are produced at the LHC, and how they decay. Thus, we identify the best search channels for the composite quarks in composite Higgs models.

We find that those channels strongly differ for first, second, and third family partners. To obtain bounds on the model, we combine several recent ATLAS and CMS searches.

We find that up- and top-partners are stronger constrained by the current ATLAS and CMS analyses, whereas the mass bound on charm-partners lies at only 550 GeV.

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