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Can gauge theories of flavour be accessible at the LHC?

There is no explanation in the Standard Model for the existence of families and for their mass hierarchy. It is possible to think to some horizontal symmetries between families and their spontaneous breakdown. Then new interactions will arise and compositeness limits must be respected. But the more stringent limits may arise from flavour changing neutral currents and CP-violation. However there could be suppression effects due to custodial symmetry.

It results that the horizontal gauge bosons mediating flavour changing transitions between families can be as light as TeV, without contradiction with the experimental limits of the flavour changing processes (kaon system, heavy neutral meson systems, muon decay, tau decay, etc.). Thus they can be detectable at the LHC.

Experimental Collaboration

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