Boosted top and Higgs physics

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The two most recent additions to the Standard Model of Particle Physics are the top quark, the heaviest fundamental particle, and the Higgs boson, key to the electroweak symmetry breaking mechanism. Both particles are unstable and decay before interacting with particle physics detectors.

They are studied in the Large Hadron Collider in a high energy environment. In such a situation, the top's and Higgs' decay products overlap when they are produced with boost.

Special techniques, such as the first kt splitting scale, Shower Deconstruction and the BDRS tagger are used to disentangle the top and Higgs decay products and optimise their detection in modern days particle physics detectors.

The first kt splitting scale and the Shower Deconstruction taggers are studied in a search for a new particle decaying in top particle pairs, while the BDRS method is also used in the search for two Higgs bosons decaying into four b quarks in a phenomenological study.