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Diagnosing the top-quark angular asymmetry using LHC intrinsic charge asymmetries SIMON KNAPEN, YUE ZHAO, MATTHEW STRASSLER, Rutgers University — Flavor-violating interactions involving new heavy particles are among proposed explanations for the $t\bar{t}$ forward-backward asymmetry observed at the Tevatron. Many of these models generate a $t\bar{t}$-plus-jet signal at the LHC. In this paper we identify several new charge asymmetric variables in $t\bar{t}j$ events that can contribute to the discovery of such models at the LHC. We propose a data-driven method for the background, largely eliminating the need for a Monte Carlo prediction of $t\bar{t}$-plus-jets, and thus reducing systematic errors. With a fast detector simulation, we estimate the statistical sensitivity of our variables for one of these models, finding that charge-asymmetric variables could materially assist in the exclusion of the Standard Model across much of the mass and coupling range, given 5 inverse fb of data. Should any signal appear, our variables will be useful in distinguishing classes of models from one another.

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