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Jet Topology

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We introduce persistent Betti numbers to characterize topological structure of jets. These topological invariants measure multiplicity and connectivity of jet branches at a given scale threshold, while their persistence records evolution of each topological feature as this threshold varies. With this knowledge, in particular, we are able to reconstruct branch phylogenetic tree of each jet. These points are demonstrated in the benchmark scenario of light-quark versus gluon jets. This study provides a topological tool to develop jet taggers, and opens a new angle to look into jet physics.

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