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Flavor-Tagging of Quark Pairs at e^+e^- Higgs/Top Factories

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At e^+e^- colliders, it is possible to separately measure the branching ratios for Higgs decays to bb , cc , and light quark and gluon jets. However, this imposes extraordinary requirements on heavy quark tagging. We have been studying the capabilities of e^+e^- detectors for heavy quark tagging using the reactions $e^+e^- \rightarrow qq$, with $qq = cc, bb, tt$ at 250 and 500 GeV. We will show with detailed simulations using the ILD detector concept that the production rates and the forward-backward asymmetries of all three processes can be measured at the 0.1% - 0.5% level, and we will explain how systematic errors can be controlled to reach this level of accuracy. It is possible to achieve superb measurements of secondary and tertiary vertices and measurement of the vertex charges to distinguish quarks from antiquarks. We will also comment on the direct relevance of these 4-fermion reactions to electroweak symmetry breaking by showing their discovery potential for Randall-Sundrum models with warped extra dimensions.

speaker known

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