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The automatic reconstruction of the particles with machine learning at e+e- collider

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We have studied the automatic reconstruction of particles at e+e- collider, especially B meson, using machine learning algorithm. The main purpose of the research with e+e- collider is to precisely measure the Standard Model and search for the evidence of New Physics beyond the Standard Model. The analyses of B meson are the main objects for e+e- collider. A pair of B meson are created from e+e- collider and one of them are regarded as signal and reconstructed. Automatic reconstruction of other B makes it possible to improve the quality of events by utilizing information provided by other B, even in a situation where complete reconstruction of signal B is impossible due to non-searchable particles, such as neutrino, are included in the decay mode. In order to take advantage of automatic reconstruction, a 'tagging' method has been developed and used in B meson analyses with e+e- collider. We introduce the tagging method of 'other' B meson using machine learning algorithm. We have applied the method of automatic reconstruction and checked the effect of it when studying one of lepton-flavor-violating decay modes with simulated samples.

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