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Study of the Higgs couplings to leptons and Higgs CP properties at the ILC

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In the Standard Model the many Yukawa couplings between the Higgs and fermions, responsible for the mass generation for fermions, are predicted to be strictly proportional to the masses of fermions. Any deviation from this prediction would clearly signal new physics beyond the SM. Many alternative ways of introducing Yukawa couplings in BSM models can result in quite different characteristics for different types of fermions, e.g. up- or down-type, lepton- or quark-type, 3rd-, 2nd- or 1st-generation. More over, if the SM-like Higgs is an admixture of CP even and CP odd states, as preferred in the electroweak baryon genesis models which can potentially explain the baryon number asymmetry in our universe, the Higgs Yukawa couplings will be modified at the tree level. In particular the Higgs to tau tau decay process provides an ideal place for probing the Higgs CP properties. In this talk, we will give the prospects about the measurements of Htautau and Hmumu couplings at the International Linear Collider (ILC), including the Higgs CP phase measurement in Higgs to tautau process using a novel tau reconstruction method. All the simulation studies are performed based on the full detector simulation for the International Large Detector (ILD).

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