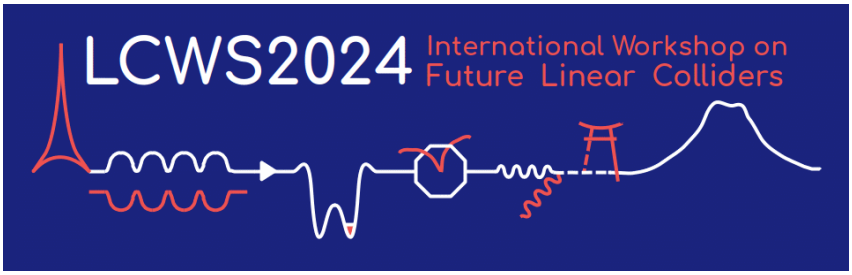

Contribution ID: **67** Type: **Oral presentation (in person)**

Searching for Charged Higgs Bosons via $e^+e^- \to H^+H^- \to c\bar{b}\bar{c}b$ at Linear Colliders

Wednesday 10 July 2024 11:00 (20 minutes)

We study a search for the charged Higgs boson via $e^+e^- \to H^+H^- \to c\bar{b}\bar{c}b$ at the 500 GeV ILC. In a general two Higgs doublet model without Z_2 symmetry, extra Yukawa couplings ρ_{tc} and ρ_{tt} can drive electroweak baryogenesis, but searches at the HL-LHC may still go empty-handed if the couplings are relatively weak. Taking $m_{H^+} \simeq m_H \simeq m_A \simeq 200$ GeV, with $\rho_{tc}, \rho_{tt} \sim 0.1$ and no $h(125)$-H mixing, $H^+ \to c\bar{b}$ decay is dominant, and the $c\bar{b}\bar{c}b$ final state is likely overwhelmed by QCD background at the LHC. We show that the electroweak production of H^+H^- at the ILC can be discovered with integrated luminosity of 1 ab^{-1}. Furthermore, we show that m_{H^+} can be extracted by requiring the two pairs of b and light jets be roughly equal in mass, without assuming the mass value. Thus, ILC can probe low mass Higgs bosons in multijet final states to complement HL-LHC in the future.

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Session Classification: Higgs, Electroweak

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