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Light charged Higgs boson production in futures ep colliders

The production of a light charged Higgs boson at the future Large Hadron electron Collider (LHeC) and Future Circular Collider in the mode hadron-electron (FCC-he) is studied, the main process $e^+p \rightarrow \nu_e H^\pm q$ is considered, taking in account the decay channels $H^\pm \rightarrow b\bar{c}$ and $H^\pm \rightarrow \tau \nu_\tau$ in the final state. We analyze these processes in the framework of the 2-Higgs Doublet Model Type III (2HDM-III) and asses the LHeC sensitivity to such H^\pm signals to opposite a variety of both reducible and irreducible backgrounds. The prospects for H^\pm detection in the 2HDM-III are promising.

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