## First Pan-African Astro-Particle and Collider Physics Workshop



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## Searches for heavy scalar resonance through hadronic jet reconstruction at electron-proton colliders

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A search for the *CP*-even scalar *H* in a SM + real singlet scalar field  $\phi_H$  model is presented. A proposed high energy Future Circular Hadron-Electron Collider (FCC - LheC) would provide sufficient energy in a clean environment to probe the heavy scalar *H* resonance,  $m_H \approx 270$  GeV in deep inelastic scattering (DIS) charged current (CC) and neutral current (NC) process.

Here we investigate the decay of the heavy Higgs like scalar  $H \to WW^*$  in DIS electron-proton collision with an integrated luminosity of 1.0 ab<sup>-1</sup> and centre of mass energy of  $\sqrt{s} = 1.3(1.8)$  TeV at FCC-LHeC. We estimate the likelihood of detecting a resonance signal of H from its final state jets by imposing cut based and machine learning optimization methods to select candidate jet pairs and reconstruct the mass of H.

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