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Exotic Nstar: from light quarks to Charm and Beauty

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We explore the photo-production of possible exotic N^*, which are narrow pentaquark candidates containing light quarks or Charm or Beauty. The latter two are also known as P_c and P_b states in literatures. We analyzed the Compton scattering off the proton in the third resonance region in a coupled-channel effective Lagrangian model with K-matrix approximation. The evidence of exotic N^* with light quarks are found to be weak at present. Motivated by the P_c observed by LHCb, we discussed the possible signal of P_c and P_b states in $\gamma p \to J/\psi p$ and $\gamma p \to \Upsilon p$, respectively at an Electron-Ion Collider (EIC) in order to disentangle the nature of these states.

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