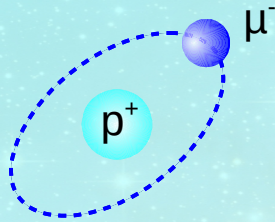


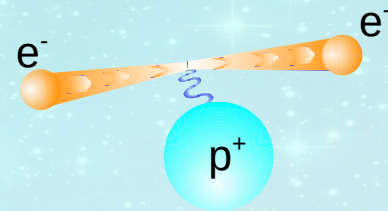




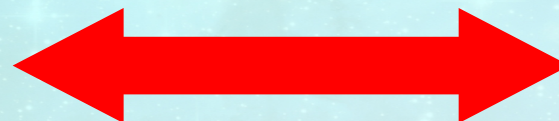
# The Proton Radius Puzzle



muonic hydrogen  
spectroscopy



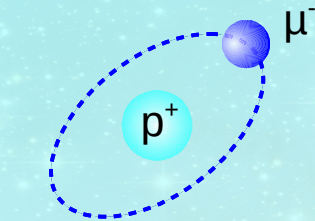
electron-proton  
scattering



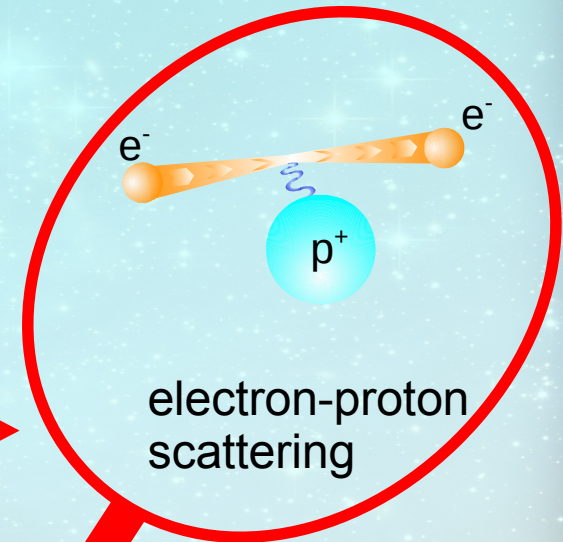
$7\sigma$  discrepancy for  
the proton radius



# The Proton Radius Puzzle



muonic hydrogen spectroscopy



electron-proton scattering

$7\sigma$  discrepancy for the proton radius

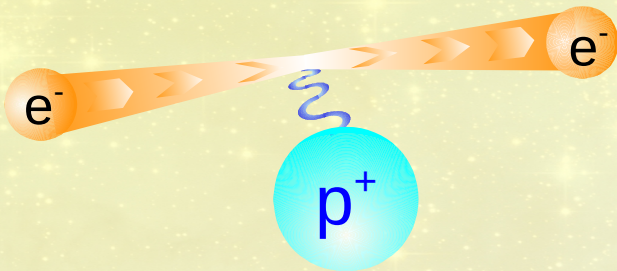
New scattering experiment to help solving the puzzle



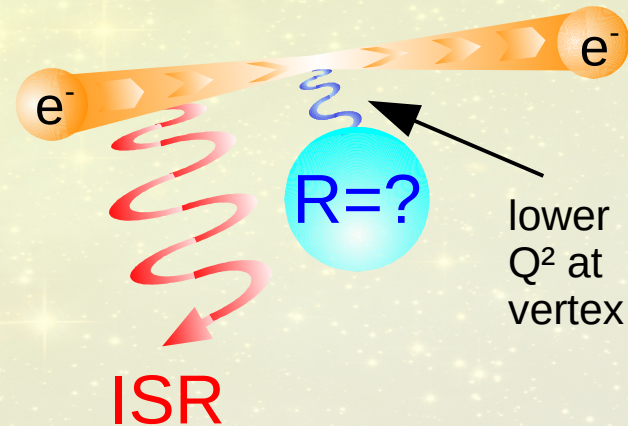
# Proton radius via Initial State Radiation

$$\langle r_p^2 \rangle = -6 \hbar^2 \left[ \frac{dG_E(Q^2)}{dQ^2} \right]_{Q^2=0}$$

To determine the proton radius measuring at **very low  $Q^2$**  is crucial.



elastic scattering: classical approach



Novel approach with initial state radiation to measure at **very low  $Q^2$**