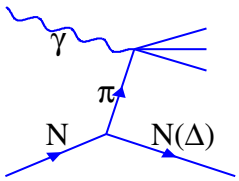
Origins of the Nucleon Sea: Non-Perturbative

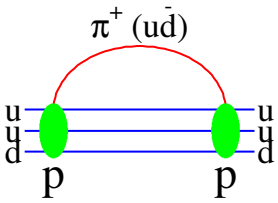
- Meson Cloud in the nucleon
  Sullivan process in DIS:

  $\Rightarrow\ |p\rangle = |p_0\rangle + a|N\pi\rangle + b|\Delta\pi\rangle$

  $\Rightarrow\ p \to N + \pi$

  $\Rightarrow\ p \to \Delta + \pi$

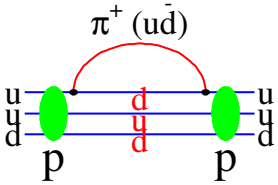




- Chiral Model

  $\Rightarrow$ Interaction between Goldstone Bosons and valence quarks

  $\Rightarrow\ u \to d\pi^+$ and $d \to u\pi^-$



- Instanton Model