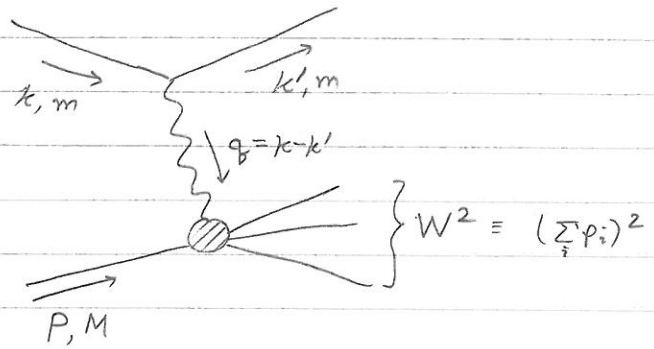
DIS kinematics



Invariant variables:

$S = (k+P)^2$ ≡ COM energy (squared) ← Input kinematic variable

$-t = -q^2 = Q^2 = (k-k')^2$ ≡ momentum transfer

$\nu = k \cdot P$ ≡ Lab frame energy transfer (times mass)

Output kinematic variables

$W^2 = (P+k+k')^2$

$= (P-q)^2$ ≡ Recoil mass (squared)

$x = \frac{Q^2}{2P \cdot q}$ ≡ Bjorken x

$y = \frac{q \cdot P}{k \cdot P}$ = inelasticity variable

Common choices for (output) independent variables:

Set 1: Q^2, W^2 1960's choice

Set 2: Q^2, x 1970's choice

Set 3: x, y modern choice