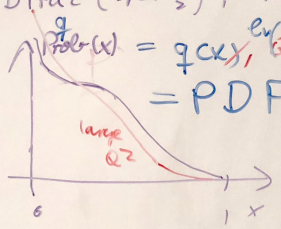
parton → Gluon (spin-1 gauge boson) carries momentum fraction x in BF

↑

Dirac (spin-$\frac{1}{2}$) particle called "quark"

$f_{q/p}(x) = q(x, ev(Q^2))$

$= PDF$



BF: $x = \frac{p_i}{P_i}$

IMF: $\Rightarrow P_i \infty$, $p_i \infty$

$Q^2 \to \infty$

$\nu \to \infty$

Q^2/ν = const

$x = \frac{p_i}{P_i}$

$p_+^q = 2p_i = \sqrt{Q^2}$ $\quad P_+ = \frac{\nu+q}{\sqrt{Q^2}} M$

Light cone

Momentum fraction

$\xi = \frac{p_+^q}{P_+^p} = \frac{Q^2}{M(q+\nu)}$

$x = \frac{Q^2}{2M\nu}$

$= \frac{Q^2}{2P^\nu q_\nu}$

$x = 1$ → elastic

$0 \le x \le 1$

Quarks:

	q	M	
u	$+\frac{2}{3}$	2-5	MeV
d	$-\frac{1}{3}$	3-7	MeV
s	$-\frac{1}{3}$	100-200	MeV
c	$+\frac{2}{3}$	> 1	GeV
b	$-\frac{1}{3}$	~ 5	GeV
t	$+\frac{2}{3}$	178	GeV

$\Gamma^2 - \Gamma^2\beta^2 = 1$

$\Gamma = \frac{1}{\sqrt{1-\beta^2}}$

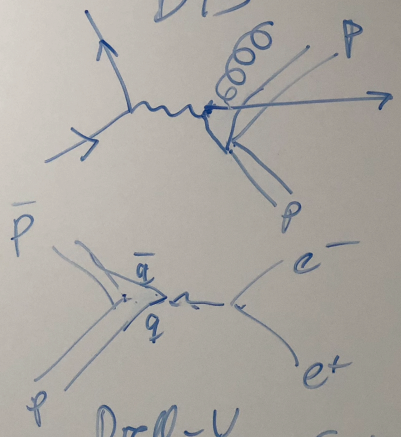
$\frac{q_+^2 - \nu^2}{Q^2} = \alpha^2 = 1$

$p_+ = E + p_z$ = light cone momentum

$p_- = (E - p_z)$

LT(1): $p_+ \to p_+ \Gamma(\beta+1)$

DIS



Drell-Yan Scattering

DYS

