

Outline

- Relativistic Kinematics
 - ▶ $(4\text{-momentum})^2$ invariance, invariant mass
 - ▶ Hypothesis testing, production thresholds
 - ▶ Cross sections, flux and luminosity
 - ▶ Particle lifetime, decay length, width
- Classification of particles
 - ▶ Fermions and bosons
 - ▶ Leptons, hadrons, quarks
 - ▶ Mesons, baryons
- Quark Model
 - ▶ Meson and baryon multiplets
 - ▶ Isospin, strangeness, c, b, t quarks
- Particle Interactions
 - ▶ Virtual particles and range of forces
 - ▶ Strong and weak decays, conservation rules
 - ▶ Parity, charge conjugation, CP
 - ▶ Weak decays of quarks
 - ▶ Colour charge, QCD, gluons
 - ▶ Charmonium and upsilon systems
- Electroweak Interactions
 - ▶ Charged and neutral currents
 - ▶ W, Z, LEP experiments
 - ▶ Higgs and the future
- LHC Experiments
- Future - introduction to accelerator physics

Today

- Lecture 2 (4-momentum) - Relativistic kinematics and four momenta
 - Griffiths, pages 88-103
 - Williams, page 159
 - Handout on kinematics and units
 - Units: see also Perkins (3rd edition), pg 26.

Fixed target vs. collider

COMPASS experiment

ATLAS experiment



