LHC experiments: ATLAS and CMS
Computer generated image of the ATLAS detector
The Mainz Microtron (MAMI)
The 3-Spectrometer-Setup @ MAMI
Outline

- Introduction to Accelerator Physics
- Particle Detectors - Principles and Techniques
- Gas Detectors, Tracking Detectors
- Scintillation and Photodetection
- Calorimetry, Particle ID
- Detector Systems
Dr. Michael O. Distler


Experiments on $N \rightarrow \Delta$ at MIT/Bates

since 1999 Research scientist and lecturer
at the Institute for Nuclear Physics, Mainz

Experiments: Formfactors (p,n,He,Li)
↔ radius of the proton
Few Body Systems ($^3,^4$He, $^6,^7$Li)
Particle Sources

- Positive ion sources
- Negative ion sources
- Electron sources
- Secondary sources
  - Positrons
  - Antiprotons
  - High energy photons
Varieties of accelerators

- **Linear Accelerators**
  - Electrostatic Accelerators
    - Tandem Van-de-Graaff
  - Wiederöe
  - RF Linacs
- **Circular Accelerators**
  - Cyclotrons
  - Synchrotron
  - Betatron
  - Microtron
Microtron

Experimental Methods in Nuclear Physics
Harmonic Double Sided Microtron

LINAC I (4.90GHz)

Injection: 855 MeV
Extraction: 1500 MeV

B_{max} = 1.539 T

LINAC II (2.45GHz)

250 T

43 recirculations

10 m
The Mainzer Microtron - MAMI

- 1.5 GeV cw electron beam
- 100 $\mu$A unpolarized
- 30 $\mu$A @ 80% polarization
- Energy stability $\delta E / E = 10^{-6}$
- 5500 h/year beam on target
LEP and LHC @CERN

THE LHC HADRON INJECTOR COMPLEX

- LHC 7 TeV p-p
- 2.76 TeV/n Pb-Pb
- SPS 450 GeV
- PS 25 GeV
- Booster 1.4 GeV
- ION ACCUMULATOR
- LINAC5
- Pb ions

Electrons
Positrons
Protons
Antiprotons
Pb ions
Future: International Linear Collider

http://en.wikipedia.org/wiki/International_Linear_Collider

Experimental Methods in Nuclear Physics