2013 CERN Latin-American School Of High-Energy Physics

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Avances
Grupo de partículas y campos
FCFM-BUAP

- Field Theory and EW Standard Model 1, 2, 3, 4
- Cosmology 1, 2, 3
- Ultra-high energy Cosmic Rays 1, 2, 3
- QCD 1, 2, 3, 4
- Flavour Physics and CP Violation 1, 2, 3
- Beyond the Standard Model 1, 2, 3
- Statistics for Particle Physicist 1, 2, 3
- Instrumentation 1, 2, 3
- LHC Results Highlights 1, 2, 3
- QCD Under Extreme Conditions 1, 2, 3

Se realizó una competencia entre los estudiantes, integrando 5 grupos de 12 personas aproximadamente.

- Higgs
- Mediciones del SM en el LHC (Nuestro Tema)
- Cosmic Rays
- Bs searching
- Flavor physics.

Nombre del Artículo: Measurement of the ZZ production cross section with 4.6 fb-1 of 7 TeV ATLAS data, arxiv:1211.6096, submitted to JHEP

Object ID: Leptons, Jets and missing energy.

Muons identification.

- They are identified matching tracks reconstructed in the muon spectrometer to tracks reconstructed in the inner detector.
- The momenta is calculated by combining the information from the two systems (muon spectrometer and inner detector).
- The momenta is corrected for the energy deposited in the calorimeters.
- The muons are reconstructed in the muon spectrometer with $pt > 20\,GeV$ and $|\eta| < 2.5$.

electrons identification.

- They are reconstructed from a energy cluster in the electromagnetic calorimeter matched to a track in the inner detector.
- Transverse momentum is computed from the calorimeter energy and the direction from the track parameters measured in the inner detector.
- The electrons required to have a transverse momentum of at least $7(20)\,GeV$ and $\eta < 2.47$
- All selected leptons must satisfy isolation requirements based on a calorimetric and tracking information consistent with originating from primary vertex.
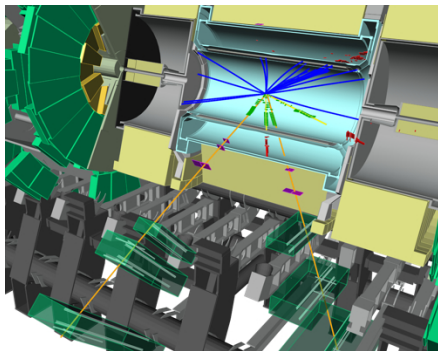
Jets.

- They are reconstructed from topological clusters of energy in the calorimeter.
- Jets are required to have $p_T > 25\,GeV$ and $|\eta| < 4,5$
- To minimize the impact of jets from pile-up at high luminosity, the jet vertex fraction is required to be at least 0,75.
- The jet vertex fraction is defined as the sum of the p_T of all the tracks associated to the jet.

The missing transverse momentum.

- E_T^{miss} is the imbalance of trasverse momentum in the event.
- A large imbalance in the transverse momentum is a signature of the $ZZ \to l^+ l^- \nu \bar{\nu}$ decay channel.
- the vector E_T^{miss} is determined from the negative vectorial sum of the reconstructed electron, muon and jet momentum together with calorimeter cells.

Simulated four-lepton decay of Higgs in the ATLAS detector.
(http://www.atlas.ch/photos/events-simulated-higgs-boson.html)