

Reconstruction Performance Of The ATLAS Muon Detector

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Poster

Muon reconstruction in LHC Run-I: Performance measured in Inner Detector (ID) and in the Muon Spectrometer (MS) using $Z \rightarrow \mu\mu$, $J/\psi \rightarrow \mu\mu$, $\Upsilon \rightarrow \mu\mu$

- Efficiency: $\sim 99\%$ over $|\eta| < 2.5$ & $p_T > 4$ GeV
- Momentum scale (MS+ID muons) known to $\pm 0.05\%$ for $|\eta| < 1$, $\pm 0.2\%$ for $|\eta| > 2.3$ ($Z \rightarrow \mu\mu$)
- Di-muon mass resolution: low $p_T = 1.2\%$ (2%) up to 2% (3%) at $p_T \approx 100$ GeV for $|\eta| < 1$ ($|\eta| > 1$)
- Simulation reproduces data resolution within 3% to 10% depending on η and p_T .

Personal Contribution

Hardware: Long standing involvement with the ATLAS Muon Spectrometer especially the MDT detector (from 2004)

- Responsible of the front end Motherboard test and upgrade of the front end Chamber Service Module in the ATLAS cavern
- Co-leader of the commissioning, installation and integration in ATLAS of the MDT endcap chambers, including the most recent additions (EE chambers in the A-side) to complete the MDT system
- In charge of the offline analysis of the DCS data to monitor the environmental variables (temperature, magnetic-field and front end electronics parameters)
- Gas expert for the whole ATLAS MDT sub-detector

Software/Analysis:

- Co-leader of the data analysis of the Gas Muon Chamber publishing every two hours the non linear drift-time vs drift radius function used in the calibration of the MDT chambers and ultimately in the muon track reconstruction
- Member of the Λ_b -group analysis into a decay channel using $J/\psi \rightarrow \mu\mu$ to trigger the event
- Coordinator of the 2014-15 Cosmic Ray Milestone Runs data analysis Task Force