MDT Projects with First Data

- ## Muon spectrometer commissioning
  with cosmics, beam halo, collisions

- ## Muon Calibration & Alignment Center
  including Muon Data Quality monitoring,
  24 h shifts, collaboration with LMU.

  2.85 FTE OTS expert tasks, 3 FTE non-expert tasks,
  0.32 FTE/ OT author!

- ## Detector performance from data

- ## Higgs and SUSY searches
  SM Higgs: $H \to 4l$, WW, VBF $H \to \tau\tau$, WW, (tt $H \to$ tt bb)
  MSSM Higgs: $A/H \to \mu\mu$, $\tau\tau$, $H^{\pm} \to \tau\nu$
  Inclusive SUSY searches: jets, E_T^{miss}, 0, 1, 2 leptons

  $\Rightarrow$ SM model backgrounds from data
  $\Rightarrow$ Measurement of SM processes

Hubert Kroha, ATLAS Meeting,
14.07.08

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Detector performance ($\geq$ 10 pb^{-1}):

✓ $Z \rightarrow \mu\mu$ decays for muon alignment, momentum scale

✓ $Z \rightarrow$ ee, $\mu\mu$ decays for e, μ efficiencies, fake rates

✓ $Z \rightarrow$ ee, $\mu\mu$ + jets for τ fake rate

✓ Optimization of τ-ID with pile-up

✓ Track jet reconstruction and calibration

✓ Lepton isolation in tt events for H $\rightarrow$ 4l

✓ Jet energy scale, e efficiency (high p_T) in semileptonic tt decays for inclusive SUSY

Background from data, SM measurements ($\geq$ 100 pb^{-1}):

✓ Inclusive muon cross section

✓ $Z \rightarrow$ ee, $\mu\mu$ + n jets and incl. cross section

✓ $Z \rightarrow \tau\tau$ background shape from $Z \rightarrow \mu\mu$ for VBF H, A/H $\rightarrow \tau\tau$

✓ $Z \rightarrow \mu\mu$ background shape from $Z \rightarrow$ ee for A/H $\rightarrow \mu\mu$

✓ WW leptonic cross section for H $\rightarrow$ WW

✓ tt leptonic cross section for H $\rightarrow$ WW

✓ tt $\rightarrow (\tau \nu$ b)(Wb) background shape from tt $\rightarrow (\mu\nu$ b)(Wb) for H$^{\pm} \rightarrow \tau\nu$ and inclusive SUSY

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Background from data, SM measurements, next priority:

- $Z \rightarrow \tau\tau$ inclusive cross section for VBF H, H/A $\rightarrow \tau\tau$

- W + n jets cross section

- tt + n jets cross section for inclusive SUSY

- ZZ background shape from sidebands for H $\rightarrow$ 4l

- ZZ cross section for H $\rightarrow$ 4l

SM Higgs limits: $\geq 1 - 10$ fb $^{-1}$

MSSM Higgs limits: ≥ 100 pb $^{-1} - 1$ fb $^{-1}$

Inclusive SUSY signals: ≥ 100 pb $^{-1}$

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