

WP2 Introduction

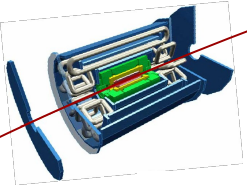
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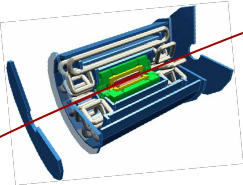
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WP2



Milestones / Description	Deliverables / Description	Deliverables /Numbering scheme	Status
Understanding the first ATLAS data through the study of Standard Model physics processes Estimated time (month 24-36)	Tools to determine from the data lepton and jet reconstruction efficiency, energy scale and resolution, integrated in the ATLAS software (closely linked to WP1).	2.1	In progress
	Improved determination of the proton structure functions	2.2	In progress
	Precise measurements of gauge boson (W,Z) pair-production cross sections.	2.3	In progress using MC data

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Deliverables 2.1 : Detector Performance from first data

- ⇒ e/γ (Sheffield, CEA Saclay) =>
 - $Z \rightarrow ee + \text{CTB}$
 - $J/\psi \rightarrow ee$? No one in Artemis is working ?
- ⇒ muons (CEA Saclay, MPS, AUTH) =>
 - work with CTB completed
 - $Z \rightarrow \mu\mu$
 - $J/\psi \rightarrow \mu\mu$ CEA, AUTH (see Samira's presentation)
- ⇒ Jets + MET (MPS, Pisa) =>
 - Energy flow
 - jet calibrations

- ⇒ On going activity on detector performance, to be used with first data : $B^+ \rightarrow J/\psi K^+$ (CSC note completed)

Detector Alignment studies from lifetime

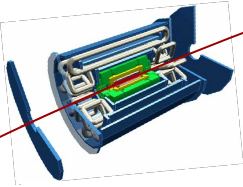
- ⇒ Starting activity : $J/\psi \rightarrow \mu\mu$ (tag and probe method)

Detector/Combined detector performance realized through :

- ⇒ CTB data
- ⇒ Current simulation studies (CSC notes)
- ⇒ Commissioning data

In all three Artemis institutes are involved

WP2



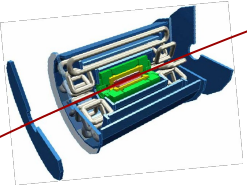
SM measurements with first data

- ⇒ W, Z cross section measurements, improved PDF's : see last months presentation by Maarten
- ⇒ $Z \rightarrow \mu\mu$ as detector calibration method (tag and probe)
 - ? Can be considered as Artemis item? (CEA, MPS, AUTH in near future - Nomidis/Ilectra?)
- ⇒ $Z \rightarrow \mu\mu/ee + jets$ as background for Higgs and ZZ^* needs dedicated study (AUTH, USFD, CEA)
- ⇒ $Zbb \rightarrow$ as measurement (+ as background for Higgs and ZZ^*) should start in Artemis (AUTH, USFD, ?CEA?)
- ⇒ $ZZ(Z^*) \rightarrow 4l$: status for cross section + TGC's presented by Ilectra
- ⇒ Pt jet inclusive x-sections (Pisa, MPS)
- ⇒ $t\bar{t}$ as background ($t\bar{t}H$, $H \rightarrow 4l$, $ZZ^* \rightarrow 4l$)
(all: UCL, USFD, Pisa, MPS, AUTH, CEA)

SM Physics Topics at startup (for Artemis institutes)

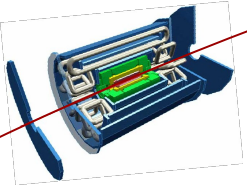
- ⇒ Minimum bias (USFD-Artemis)
- ⇒ Jet physics (Pisa MPS)
- ⇒ W, Z physics for:
 - Detector calibrations
 - W mass measurement
 - PDF's
 - VBF(W,Z) **still free**
 - Zbb
- ⇒ J/ψ & $B^+ \rightarrow J/\psi K^+$ detector + x-section
- ⇒ $ZZ(Z^*)$ x-section, TGC's, background shape

Agenda



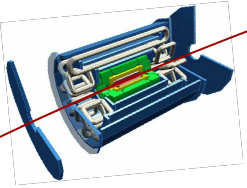
- ❑ Commissioning the spectrometers with cosmic muons - Nectarios
- ❑ Monitoring procedures with first data - Electra
- ❑ First studies with J/Psi and B+ - Samira
- ❑ Impact of W,W measurements on discovery and precision physics - Maarten
- ❑ ZZ --> 4 leptons measurement - Andreas

WP1 / WP2 Collaboration



- Aim : define a concrete workplan for the coming months
- where do we contribute w.r.t performance determination / optimization
 - electrons
 - muons
 - jets
- How to organize this coherently (i.e software-wise)
- How to feed back performance results to physics analyses and vice-versa

Summary & Conclusions



- ❑ Cross-section measurements
 - ❑ Complete program : a challenge in every aspect
 - ❑ dL/L : luminosity program well underway
 - ❑ Efficiency, scale, resolution : many auxiliary measurements
 - ❑ Need to measure **distributions** to minimize acceptance effects
 - ❑ Ratios : a possible simplification (normalization, or data-driven predictions)
 - ❑ Need to be defined carefully : eliminating L can easily introduce other, possibly larger sources of uncertainty
 - ❑ A good reference process should be correlated theoretically and experimentally to the target. **And SM-certified**

- ❑ SM cross-sections : not just background control

- ❑ PDF uncertainty sets : a great tool
 - ❑ Most important application : more than error estimation, investigation of correlations among different physics processes