



Proposal Committee Subgroup: Integration & Global Design Urgent Request to DWG

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Numbers, Numbers, Numbers, ...

88 **Acceptance:** The central detector will deliver physics in the range of $-4 < \eta < 4$ (from approximately
89 2 to 178 degrees): I think it is ± 3.8 [CHECK], augmented by far-forward and far-backward detectors
90 for maximum $x - Q^2$ coverage and detection of small angle particles vital for the physics prog

The tracking system is the core of the ATHENA setup. It is designed to cover $|\eta| < 3.5$ [CHECK] while meeting the specifications spelled out in the Yellow Report in terms of track momentum and pointing resolutions as well as a total material budget. Our proposed design leverages the impressive knowledge and developments carried out within the R&D

satisfies the needs or need projectivity in the forward region posed by the gaseous KICH, but also provides minimal practically achievable material budget (~ 1.5 nuclear interaction length)[CHECK] in the radial direction. The selection of a consistent set of sub-detectors, while matching the physics needs, allows for a clear strategy for mechanical support and installation and the development of the related engineering model. The detailed design

The Proposal is currently full of “Warning flags” concerning some basic parameters. **We need to clear this up.**

- Basic parameters like acceptance and momentum coverage needs to be
 - ▶ known/defined
 - ▶ consistent in
 - Proposal
 - Supplement Material
 - Silvia’s 90 min talk at the Dec 13-15 Review
 - Committee certainly wants to know the basic ATHENA parameters

What We Need (I)

Tracking WG

- η range of tracking: $a < \eta < b$
- low- p_T cut-off as a function of η : $p_T^{\min}(\eta)$

Calorimeter WG

- η range of coverage: $a < \eta < b$
- momentum cut-off in barrel
- e/h range (e PID) in momentum

What We Need (II)

PID WG

- η range for PID detector coverage: $a < \eta < b$
- PID momentum range for π, K, p for barrel (DIRC+ToF), forward (dRICH), and backward (pfRICH): e.g. $\pi/K - 3\sigma$ range barrel = $a < p < b$
 - ▶ "a" as K threshold with at least 3 detected photons per ring on average.
- Provide the pion threshold, this being related to the momentum region where the PID device can support e/pi separation.

What We Need (III)

S&C Group + DWG:

Material:

- $X/X_0(\eta, \phi)$ before EMCAL (2D+color-z plot)
- $\lambda/\lambda_0(\eta, \phi)$ before HCAL (2D+color-z plot)
- $X/X_0(\eta) = \int d\phi X/X_0(\eta, \phi)$ before EMCAL
- $\lambda/\lambda_0(\eta) = \int d\phi \lambda/\lambda_0(\eta, \phi)$ before HCAL

Note: ϕ dependence mostly for indicating impact of service routing

What We Need (IV)

S&C Group/Crossing-Angle Group

- 3-D distribution (or pseudo 3-d) of the interaction vertexes.
 - ▶ A number of effects are mixed there:
 - ⊙ phase-space and length of bursts, modified by the crab mechanism,
 - ⊙ crossing angle and effect of the solenoidal field.

Strategy & When Needed

Strategy

- It is clear that some detail in e.g. η range depends on engineering details which we might not know yet - we are aware that there are uncertainties
- Tools:
 - ▶ Make a best guess
 - ▶ CAD drawing (-> Elke)
 - ▶ DD4HEP
- Whatever the choice keep that number consistent across all proposal docs

Deadline:

- Given Dec 1 is near we will need the numbers and plots (material) by next Wednesday Nov 17.
 - ▶ Slides for I/GD meeting
 - ▶ Possibly plots and numbers in the Suppl. Material Wiki under “Acceptance”

And ... Another Urgent Request

Call for Proposals:

*"The realization of the conceptual detector design given the technology choices, **the R&D needs**, risks, and, if applicable, adoption of emerging new technologies."*

Only tracking group truly address R&D in

2.3.3 Risks and need for R&D

making this stick out a bit. The uninformed reader would think only they carry risks and need R&D

Agreed with Peter Jones that all DWG add a brief section on "*Needs for R&D*".

Tracking group: Consider renaming 2.3.3. to Needs for R&D removing the term "Risk". This is covered by the risk tables anyway.

Please send subsection to Peter Jones.