

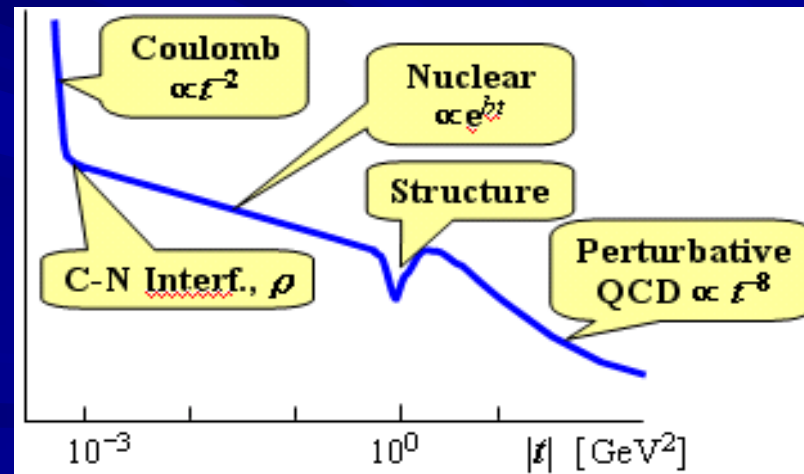
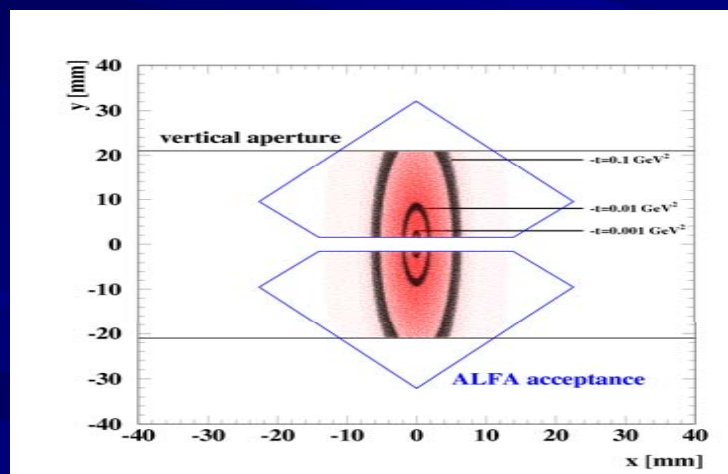
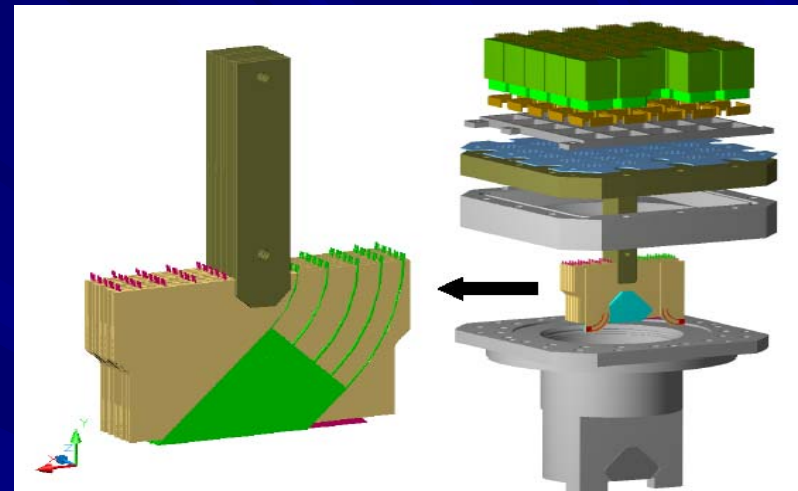
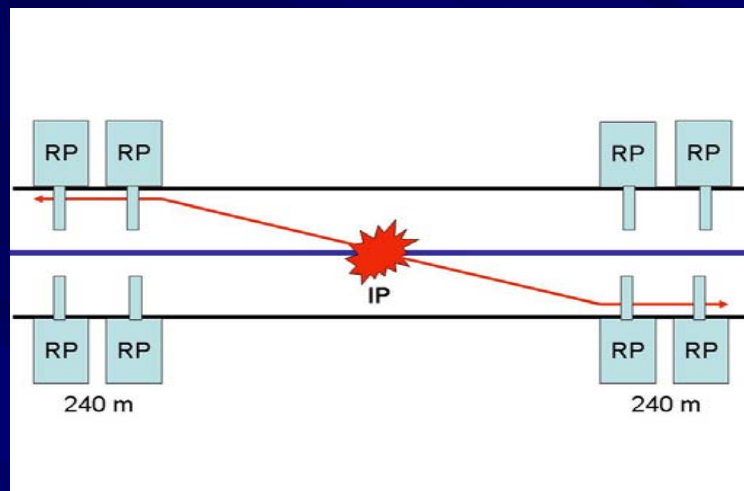
ALFA in 5 minutes

K.Hiller, DESY Zeuthen

DESY HH: I.Gregor, T.Haas, W.Hain, U.Koetz, H.Kowalski,
D.Notz, D.Petschull, U.Schneekloth

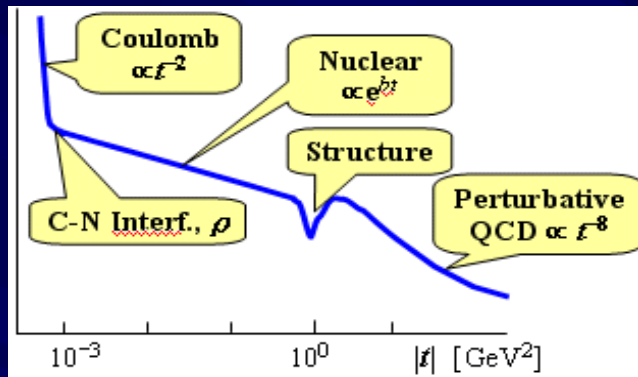
ALFA in one Slide

Absolute Luminosity For ATLAS, to calibrate the LUCID detector

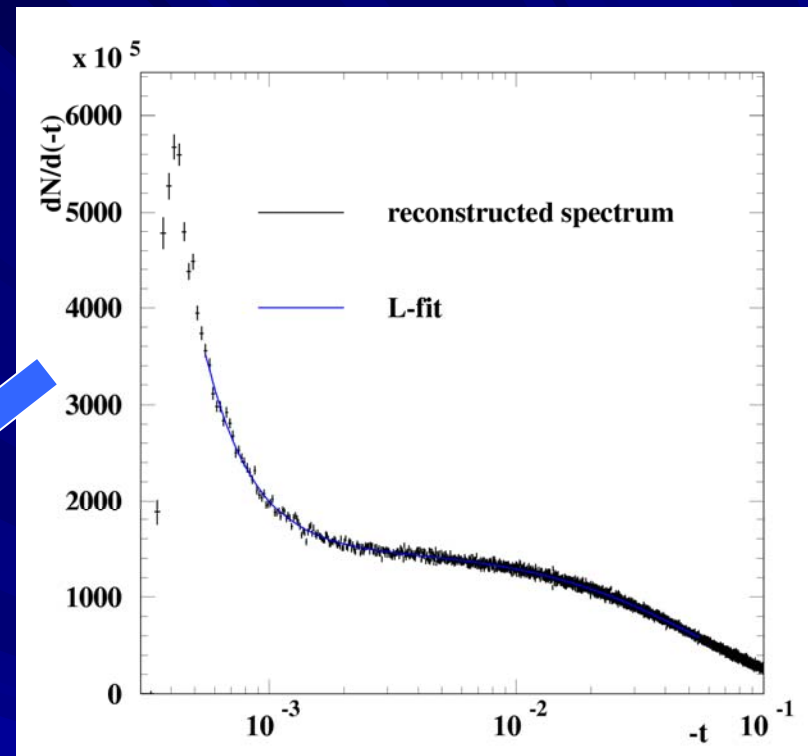


move 1.5 mm to beam $\rightarrow$ measure interference region $\rightarrow \sigma_{\text{tot}}, b, \rho, L \pm 3\%$

The Luminosity Fit



simulation
+
reconstruction



$$\frac{dN}{dt} = L\pi |F_C + F_N|^2$$

$$\approx L\pi \left| -\frac{2\alpha}{|t|} + \frac{\sigma_{tot}}{4\pi} (i + \rho) e^{-B|t|/2} \right|^2$$

	input	Fit	Stat.Error	correlation
L	8.10 10 ²⁶	8.151 10 ²⁶	1.77 %	
σ_{tot}	101.5 mb	101.14 mb	0.9%	-99%
B	18 Gev ⁻²	17.93 Gev ⁻²	0.3%	57%
ρ	0.15	0.143	4.3%	89%

$\Delta L \sim 3\%$

add background
and exp.errors

The ALFA production sites

CERN
Design
Mechanics
Detectors
Electronics
Coordination
Installation

Orsay
Maroc 1/2/3
FGAs

Lisbon
Fiber coating



Lund
motherboard

DESY HH
Fiber metrology
MAPMTs, HV

HU Berlin
Ti-substrates

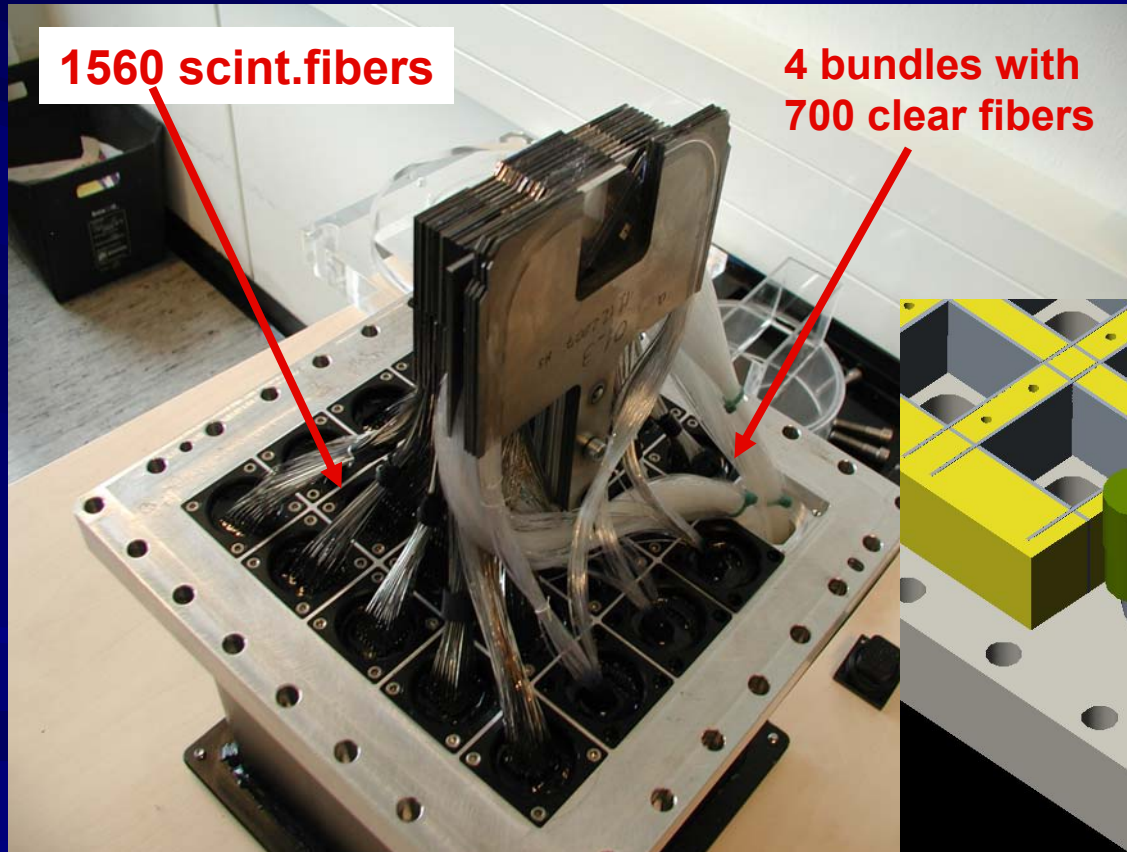
DESY Z
Triggers

Giessen
Fiber detectors
Assembling
software

Prague
mechanics
software

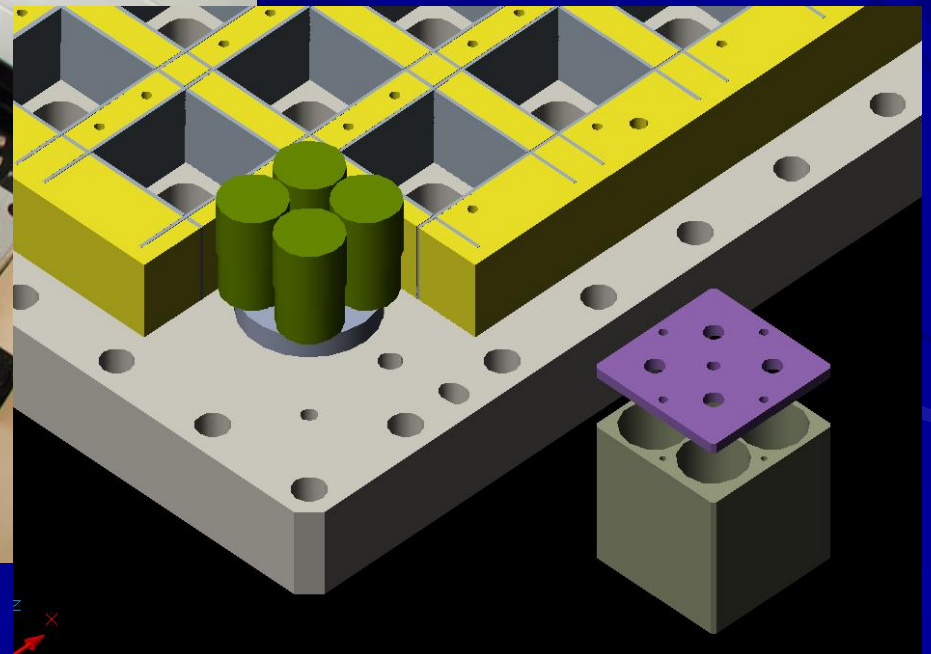
Prototype: Uni Giessen, March 2008

- ❑ Giessen: gluing of fibers to Ti-substrates
- ❑ installation issues in a very tight environment
- ❑ decision of tile readout: bundles or light guides



Prototype-2:

- assembling now at CERN
- 4 weeks test beam in July / August

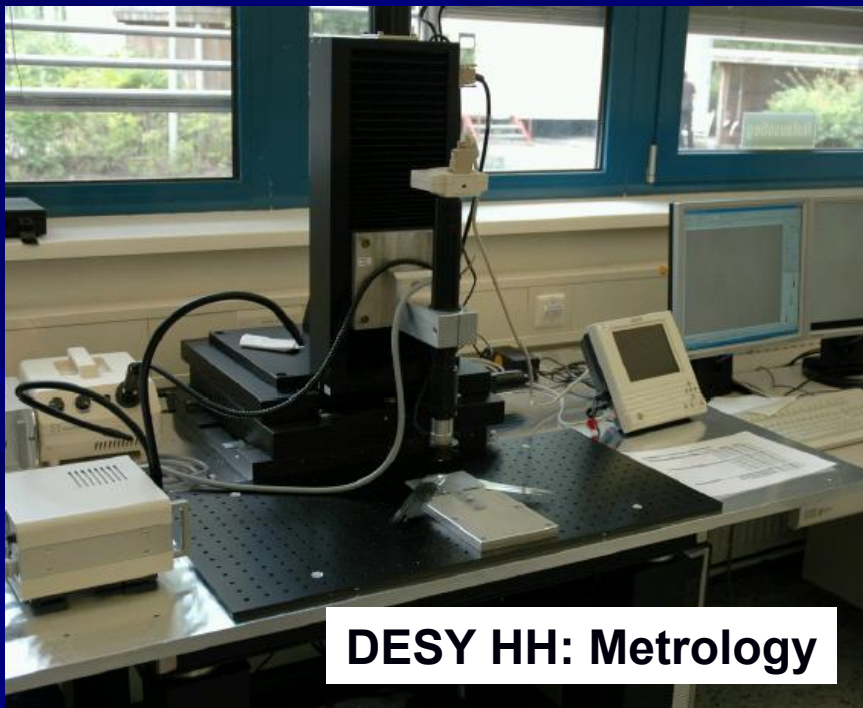




**DESY HH:
MAPMT tests**



HU Berlin: Ti-substrates & tools



DESY HH: Metrology



**DESY Zeuthen:
Trigger counters & R/O**



DESY responsibilities

- 1) MAPMTs: purchase, optical reception test, from marks to shims
- 2) detector metrology: measure central line of each fiber by microscope
- 3) trigger counters: precise 0(10 μ m) scintillator tiles + fiber bundles → Titanium

Table 11-2 ALFA detector cost (kCHF).

Items	Cost	Responsibilities
Prototypes 2005, 2006, 2007	68	CERN, Giessen
Fiber tracker	80	Giessen
Titanium plates	30	Humboldt
Aluminization	40	Lisbon
Trigger counters	40	DESY
MAPMTs	310	DESY (125), Prague (50) + 80 PMTs reused from Giessen
Total ALFA detector	568	
Total with contingency	600	



TDR, known to
DESY directorate

Total DESY costs ~ 300 EURO
→ DESY project urgently needed