



Production of the CMS Barrel-Muonchambers in Aachen

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CMS Collaboration
III. Phys. Inst. Aachen

Erice
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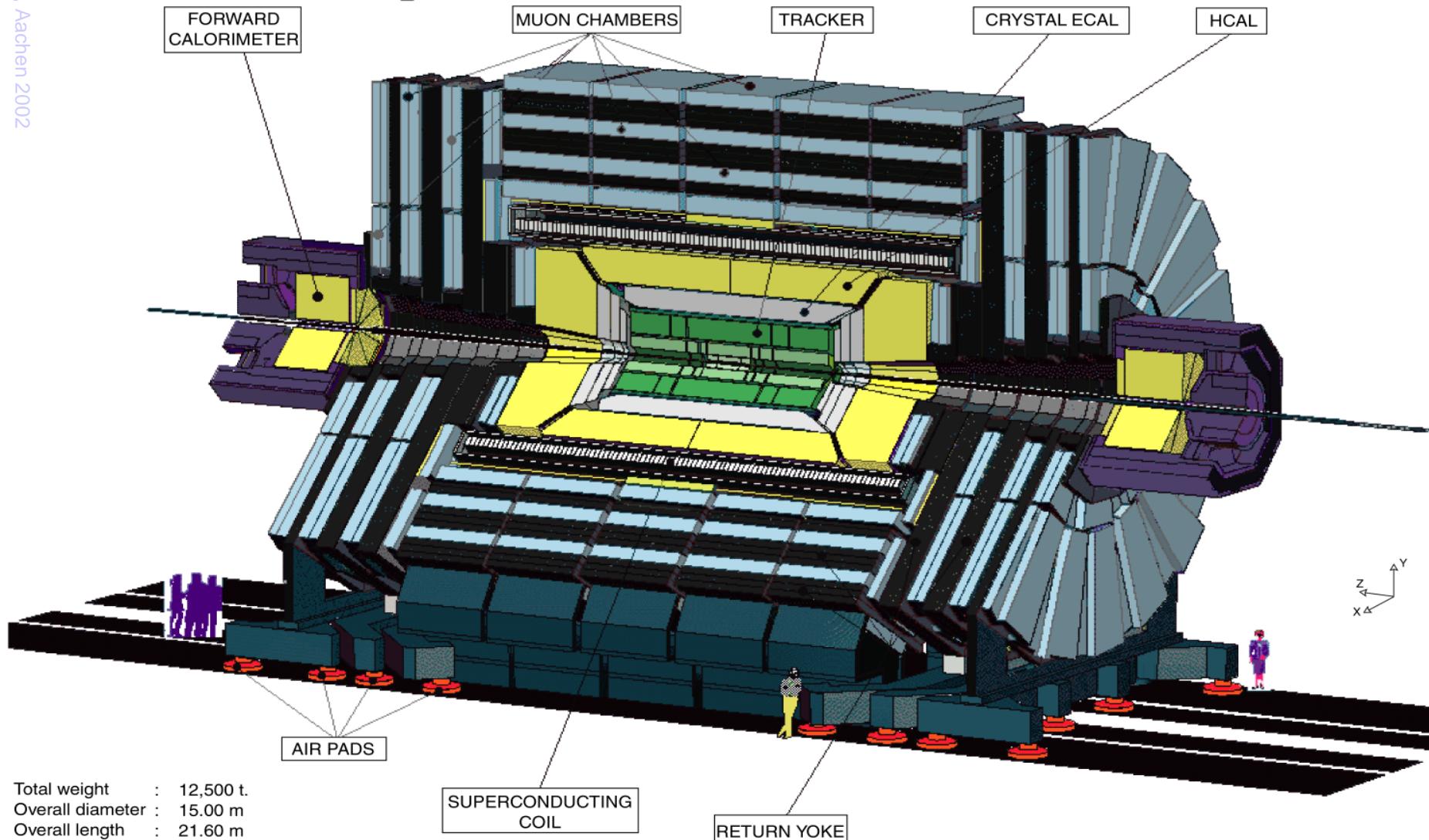


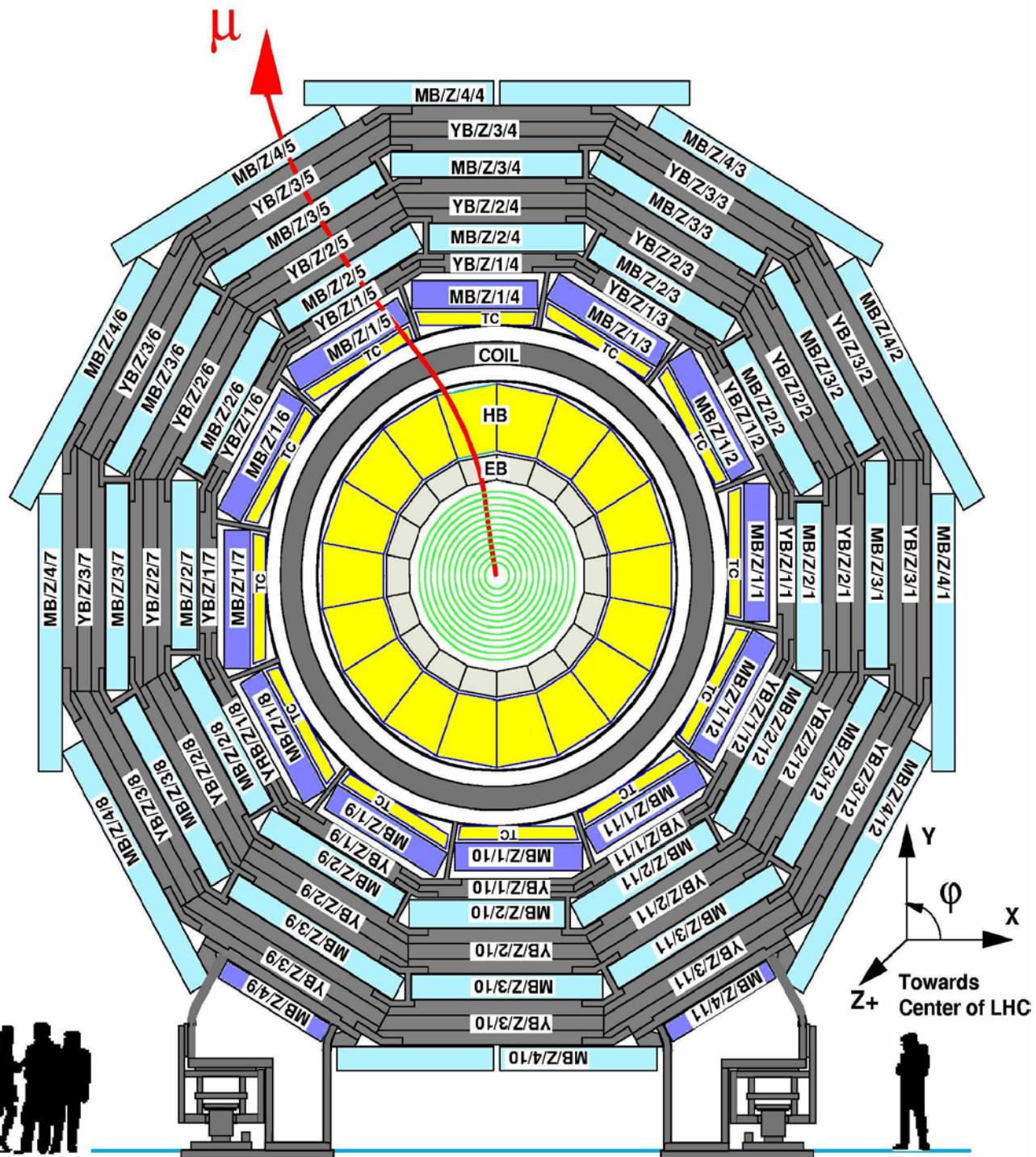
Introduction

- **design of the CMS detector**
- **muonsystem**
- **design of a drifttube**
- **production and development in Aachen**
 - production
 - quality control
 - measurements to perform
 - examples:
wire position, wire tension
- **outlook**

CMS

A Compact Solenoidal Detector for LHC



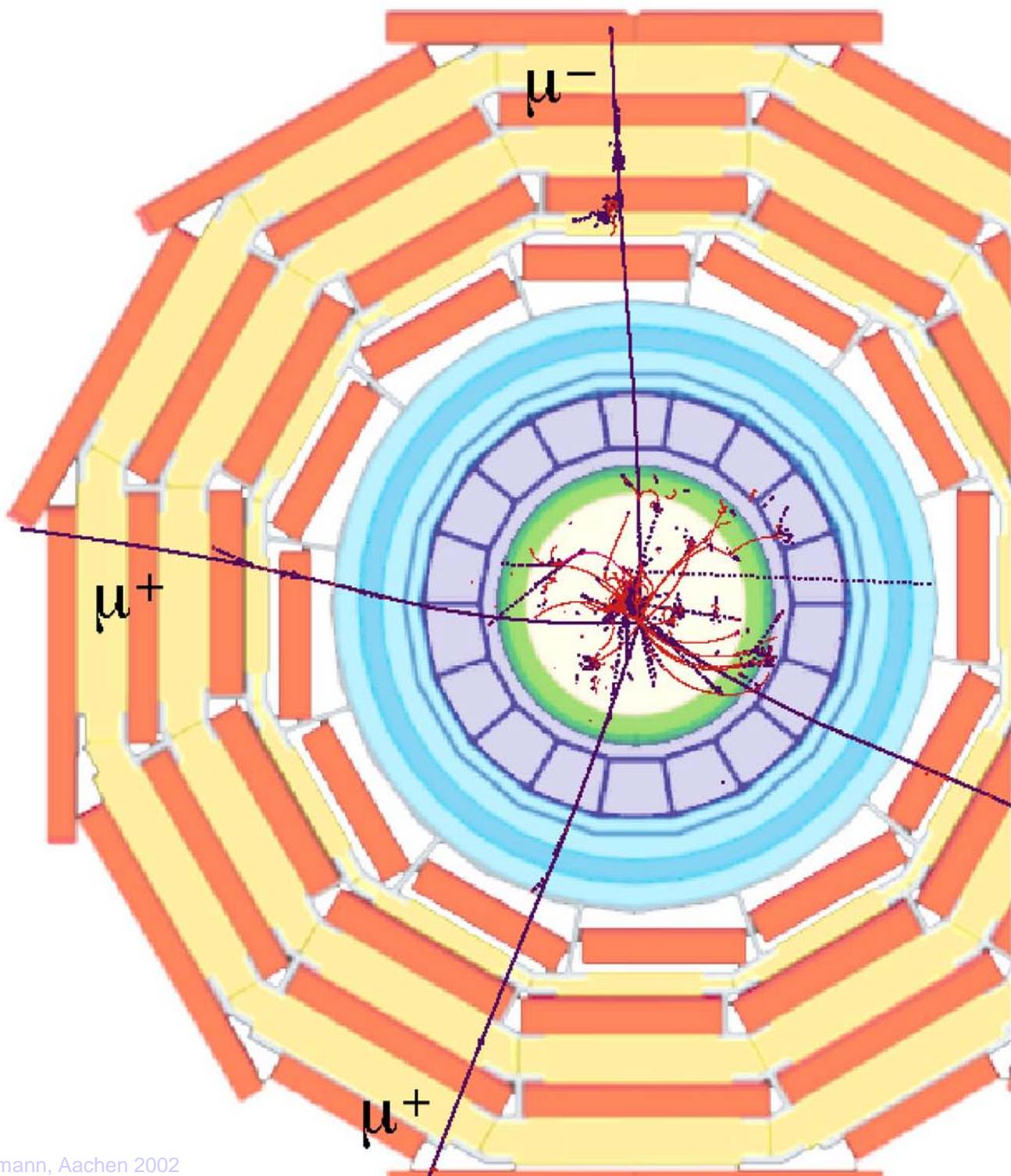


Aachen:

70 drifttubes - 2 m · 2.5 m, 12 layers each

1 chamber has in total **600 driftcells**

$M_{\text{Higgs}} = 150 \text{ GeV}$



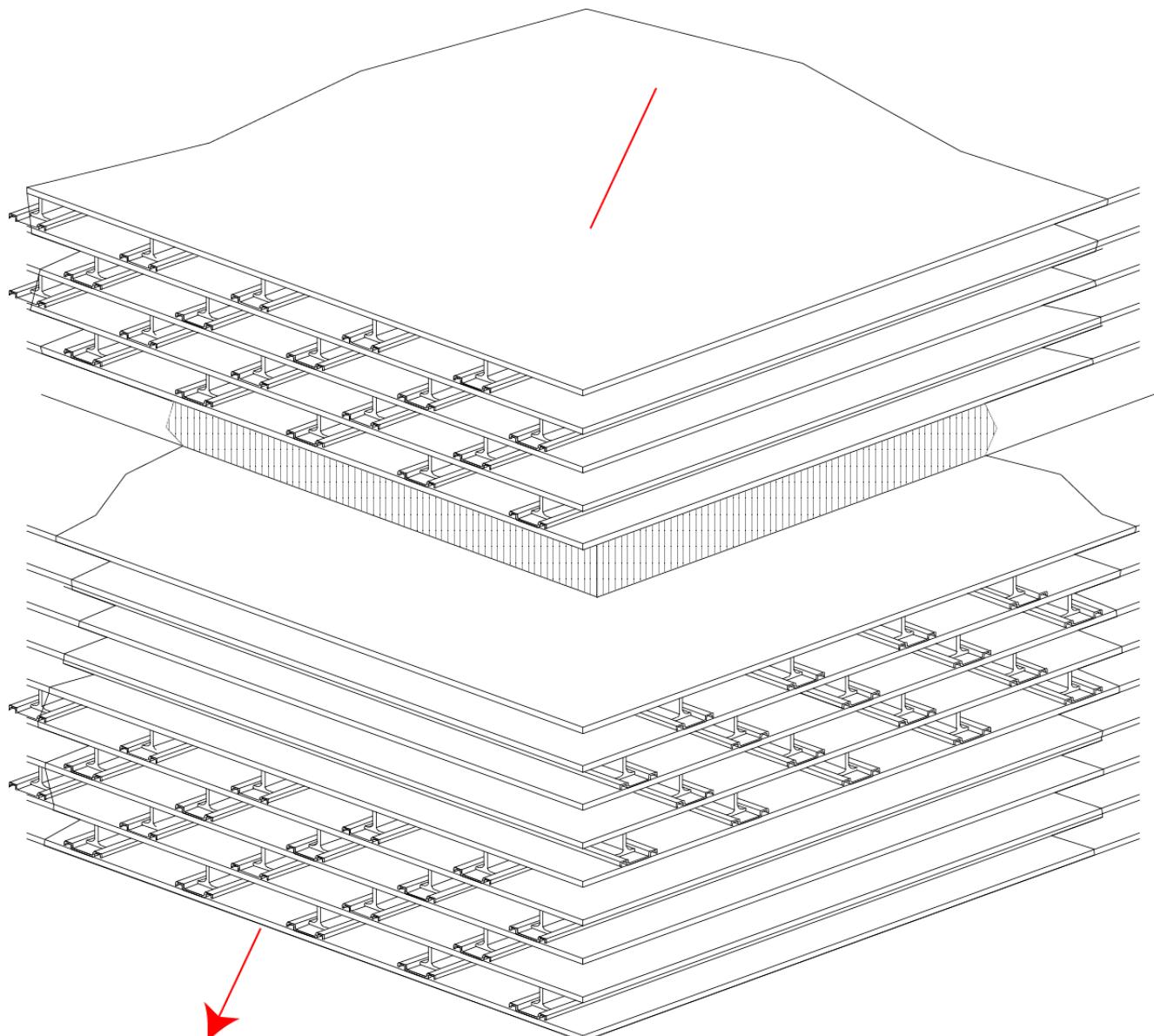


performance requirements

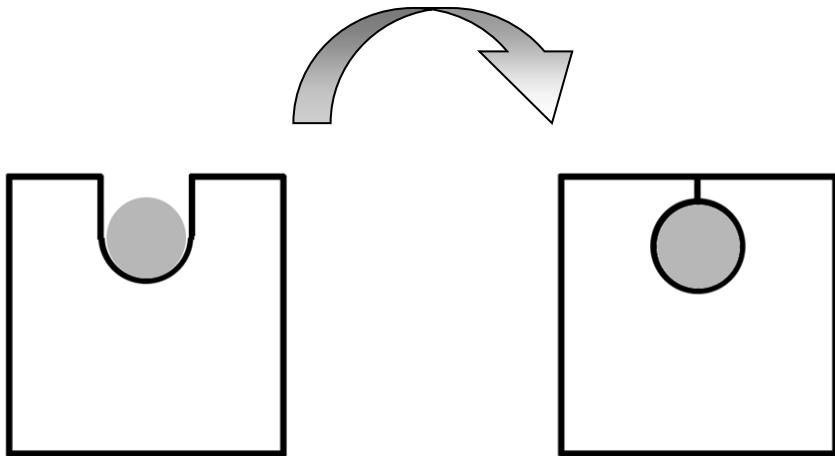
- good spatial coverage
- momentum resol.: $\frac{\Delta p_t}{p_t} < \begin{cases} 10\% & (p_t = 10 \text{ GeV}) \\ 20\% & (p_t = 100 \text{ GeV}) \\ 35\% & (p_t = 1 \text{ TeV}) \end{cases}$
- beam crossing identification (99%)
- charge assignment (for all angles, momenta < 7 TeV)

→ detector parameters

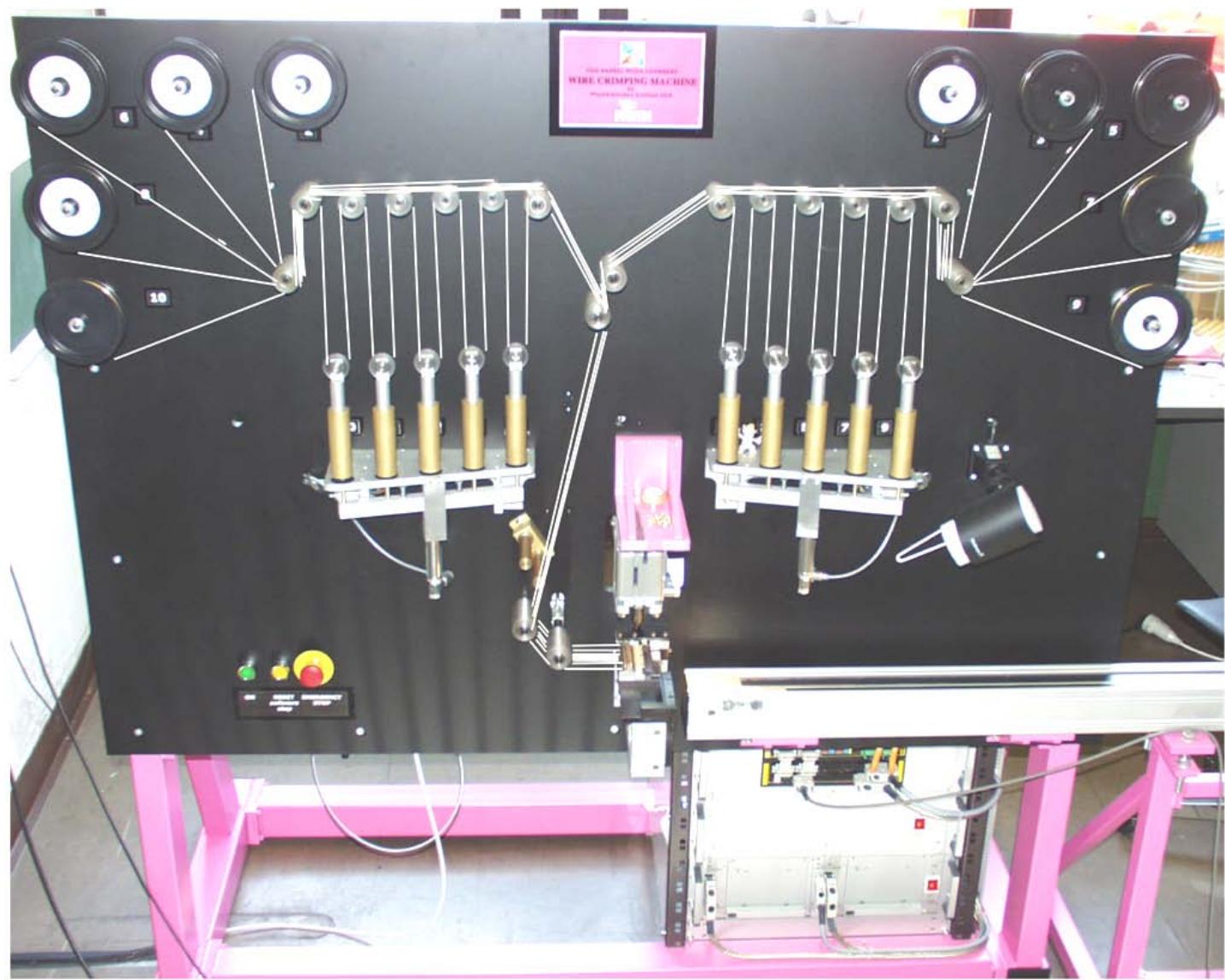
- spatial resolution per cell: ca. 250 μm
 - aim: 100 μm per chamber
- angular resolution $\rightarrow \leq 1 \text{ mrad}$
- acceptance $\rightarrow \geq 99\%$



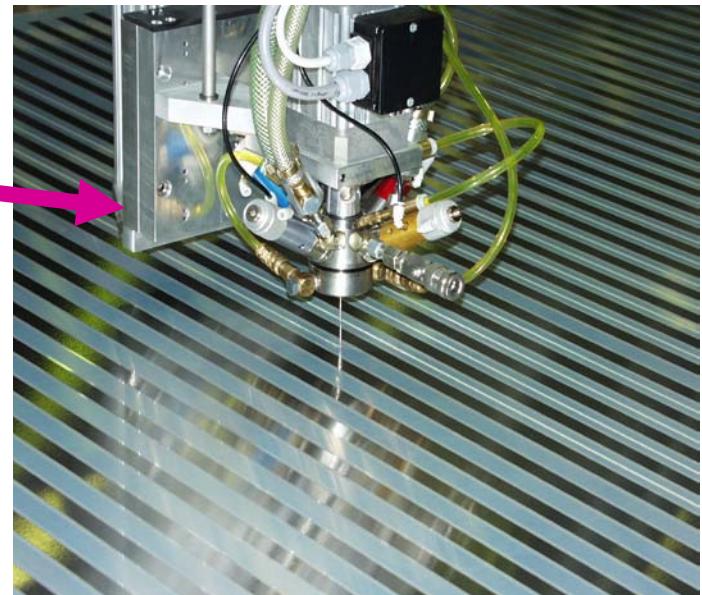
principle:



device:



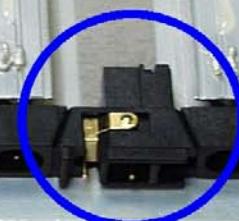
gluing head



wires

conductive glue

glue



endplug



quality control

RHEINISCH-
WESTFALISCHE
TECHNISCHE
HOCHSCHULE
AACHEN

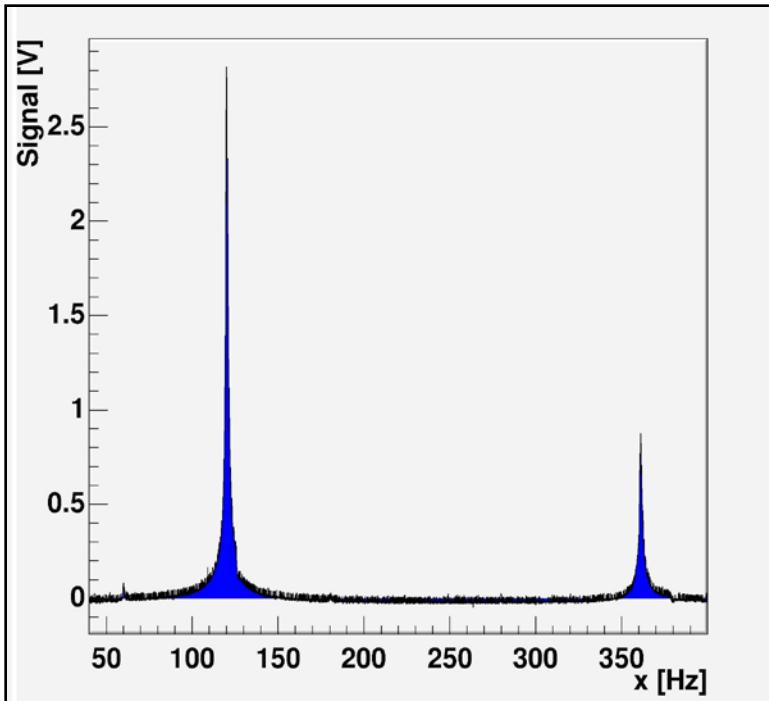
RWTH

measurements and tests in Aachen :

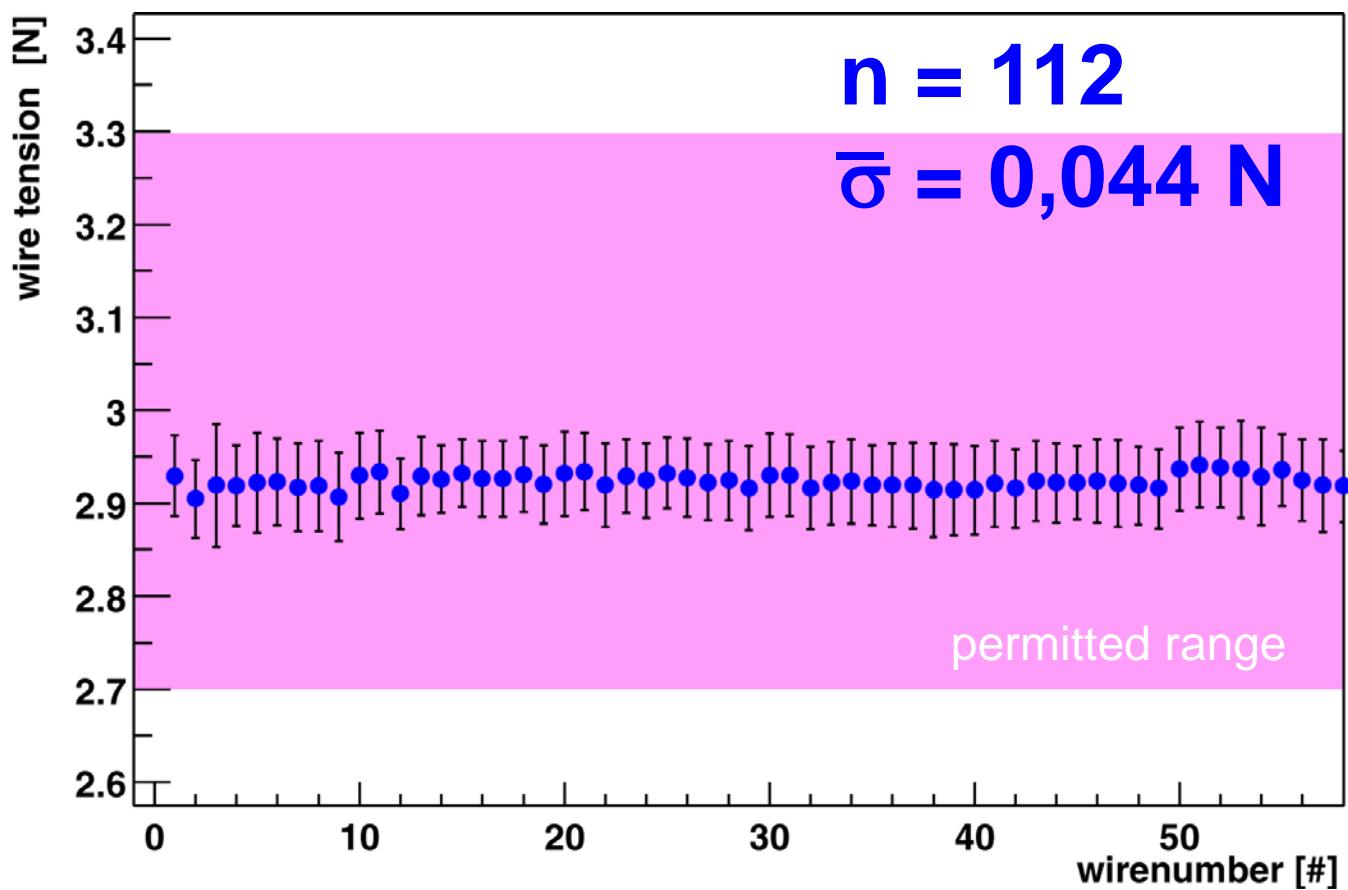
- **wire position + wire tension**
- high voltage
- gas tightness
- electronics (preamplifiers, trigger ...)
- test of single cells and entire chamber
with cosmics

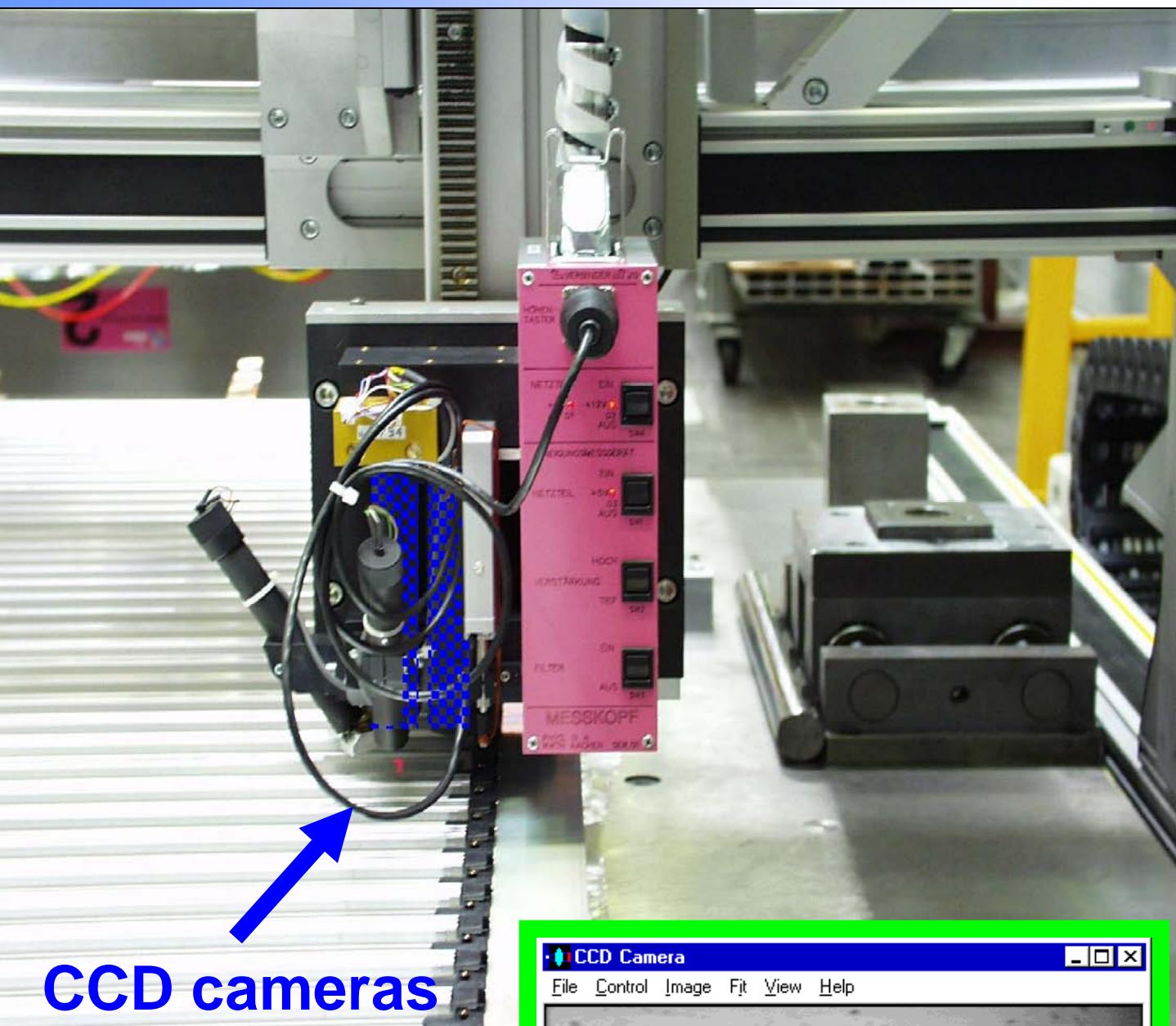


- **aim:** measurement of **wire tension**
- measure **64 wires** at once
- absolute meas. period about **5 min.**
- **control :**
manual insertion of wires



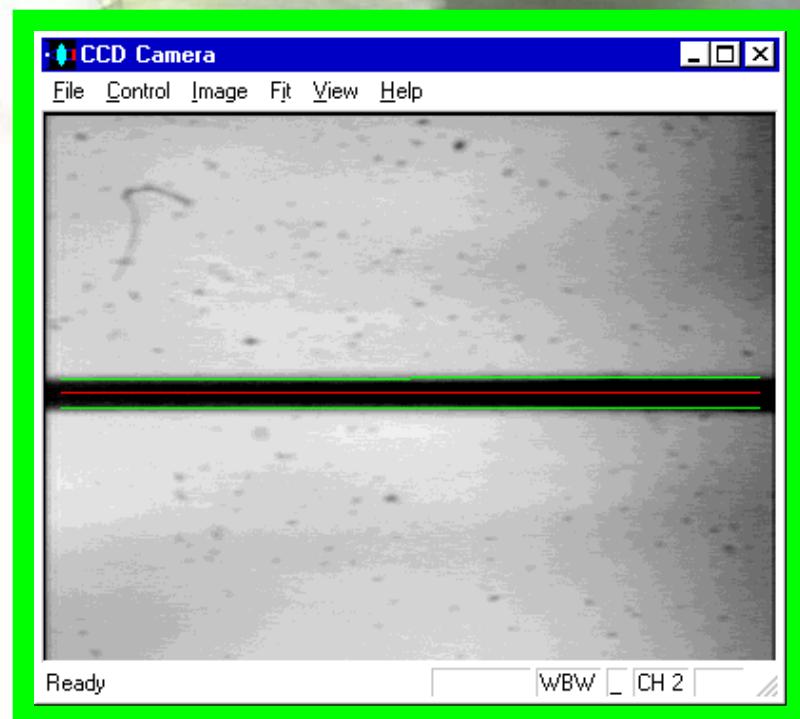
$$F = \frac{m}{l} \cdot \left(\frac{2 \cdot l \cdot f}{n} \right)^2$$





CCD cameras

camera image





outlook

- Production since spring 2001
→ 8 chambers produced and tested
- aim: 14 chambers till end 2002
- overall: 70 chambers till 2005/6