

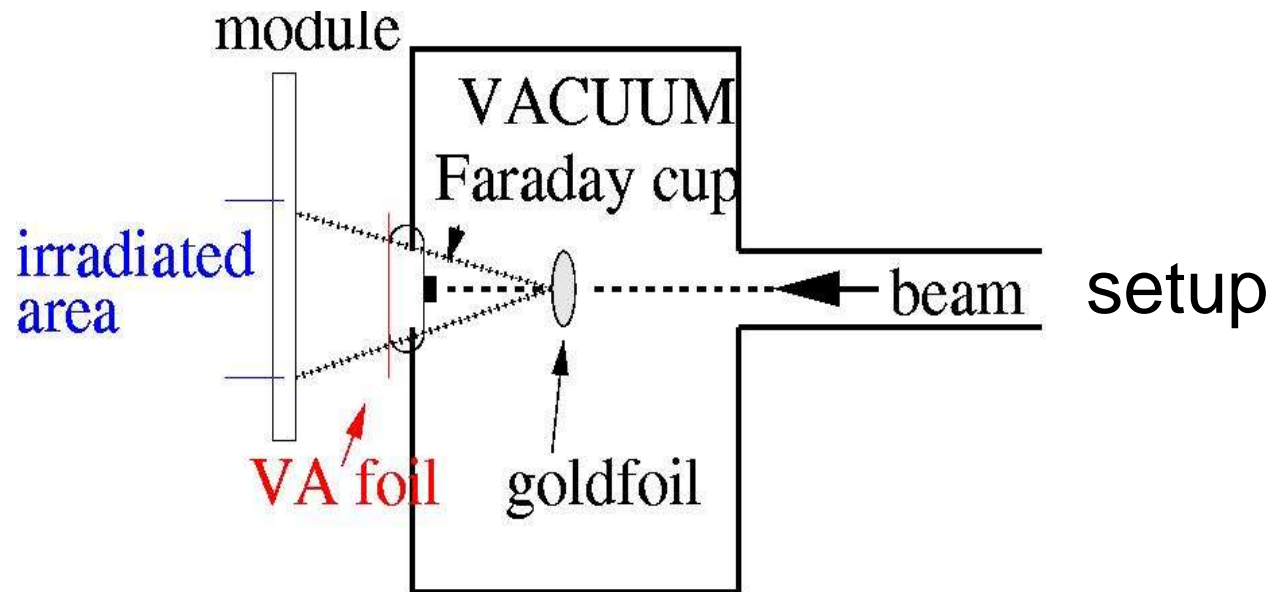
# Status of Aging Tests

Outer Tracker Meeting  
NIKHEF, 27.7.04

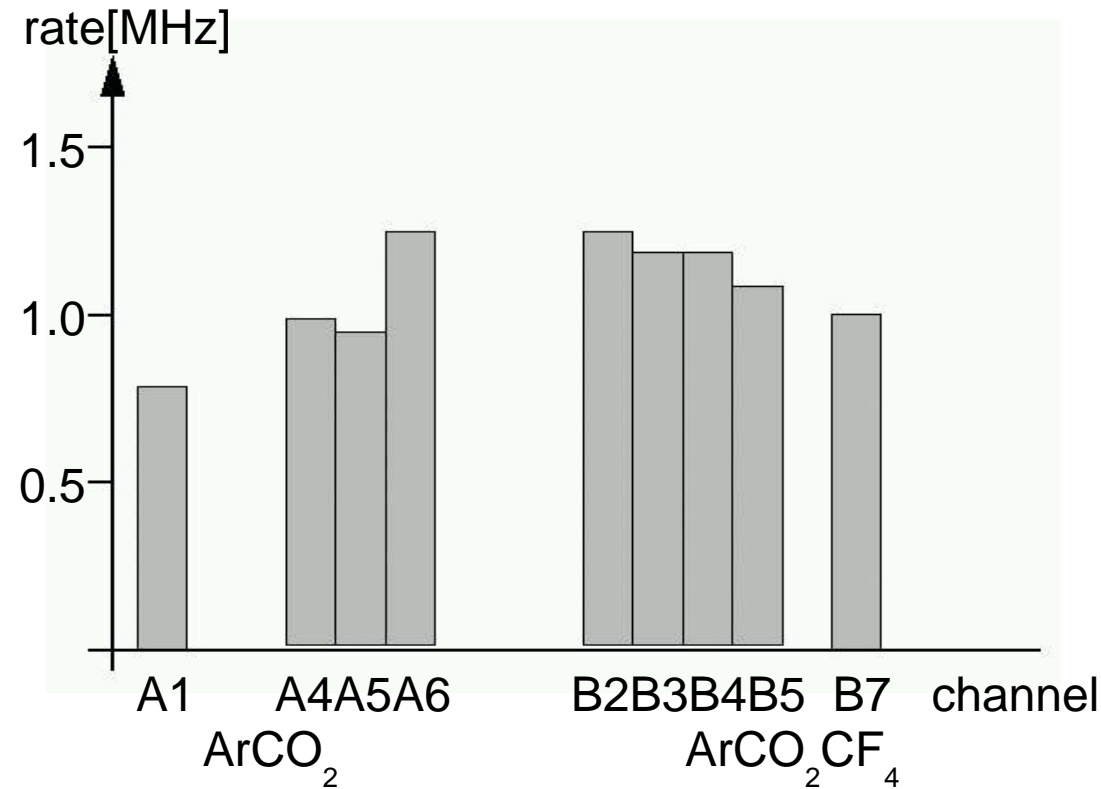
Tanja Haas

# Previous MPI test

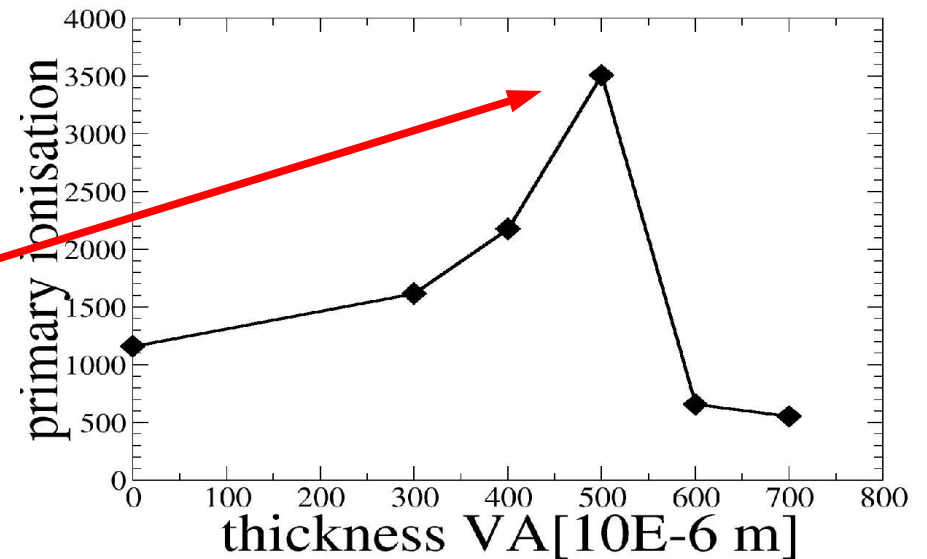
- test with 20 MeV protons (highly ionising particles)
- gas mixtures:  $\text{ArCO}_2\text{CF}_4$  (75:10:15) &  $\text{ArCO}_2$  (70:30)
- 2 testruns: Feb. 04 (48 h beam), May 04 (40 h beam)



# Previous MPI test: techniques

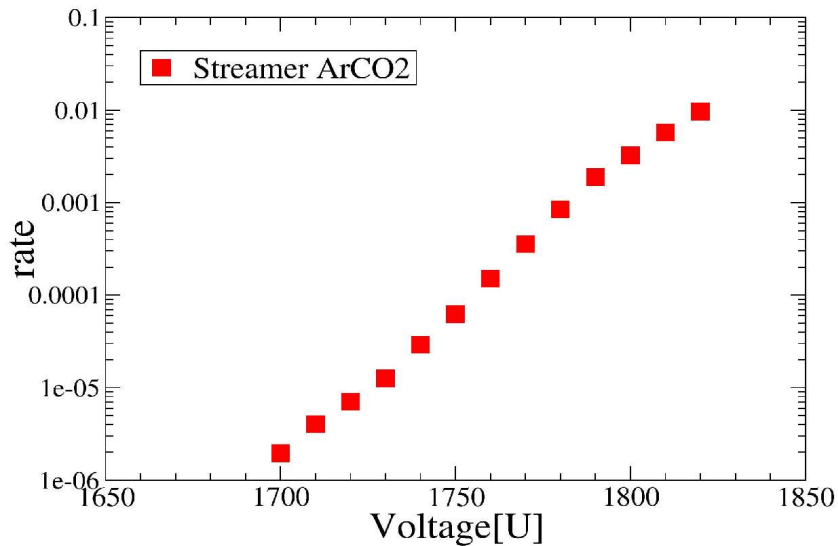


- beamprofile nearly flat
- ➔ comparable results for all straws
- measurement @ bragg peak possible



working point @ bragg peak

# Previous MPI test: streamer



ArCO<sub>2</sub>:

- first streamers @ 1700 V
- working point @ 1520 V

gain x 16

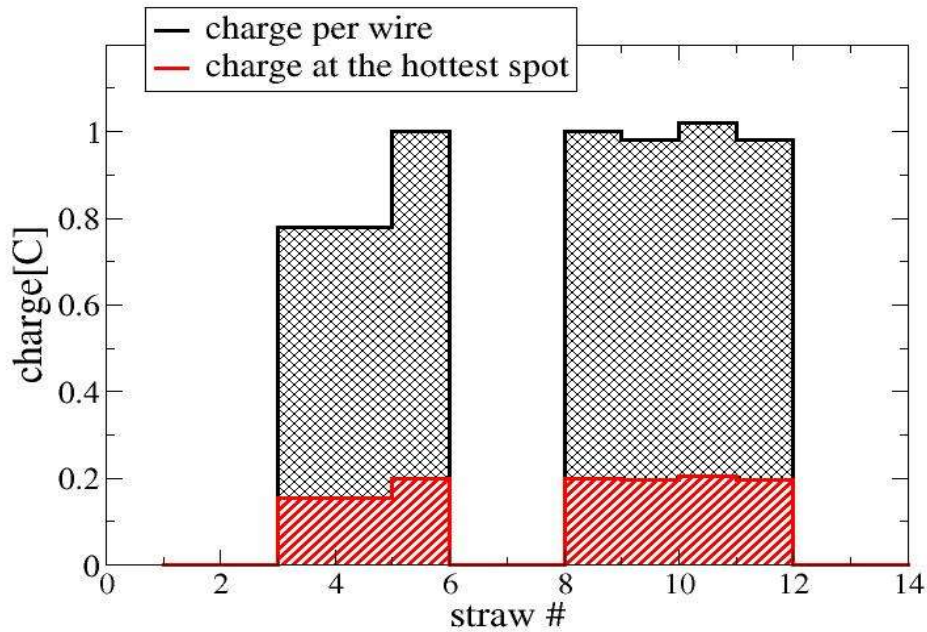
- charge deposition @ 1700 V  
approx. 1600 MIPs

$$\text{rate} = \frac{\text{rate}[\text{streamer}]}{\text{rate}[\text{signal @ plateau}]}$$

ArCO<sub>2</sub>CF<sub>4</sub>:

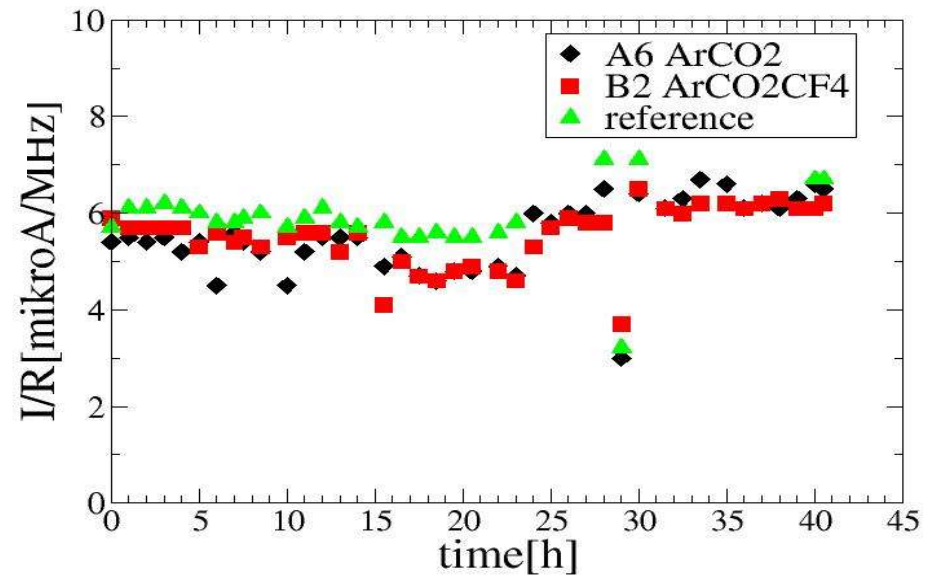
- no streamers before 1820 V!!

# Previous MPI test: results



variation in I/R ~ Gain  
for each  $\text{ArCO}_2$  &  $\text{ArCO}_2\text{CF}_4$

accumulated charge  
during 2<sup>nd</sup> run




# Previous MPI test: results

|                                   | straw | charge(C) | years |
|-----------------------------------|-------|-----------|-------|
| ArCO <sub>2</sub>                 | A2    | 0.028     | 0.14  |
|                                   | A3    | 0.064     | 0.32  |
|                                   | A4    | 0.276     | 1.35  |
|                                   | A5    | 0.456     | 2.5   |
|                                   | A6    | 0.2       | 1.0   |
| ArCO <sub>2</sub> CF <sub>4</sub> | B2    | 0.2       | 1.0   |
|                                   | B3    | 0.548     | 2.76  |
|                                   | B4    | 0.436     | 2.16  |
|                                   | B5    | 0.284     | 1.44  |
|                                   | B6    | 0.028     | 0.14  |

★first test, 11.-15.02.04

★second test, 13.-16.05.04

★both tests

acceleration factor @ 2<sup>nd</sup> test: 55-70  significant irradiation with high but tolerable acceleration factor

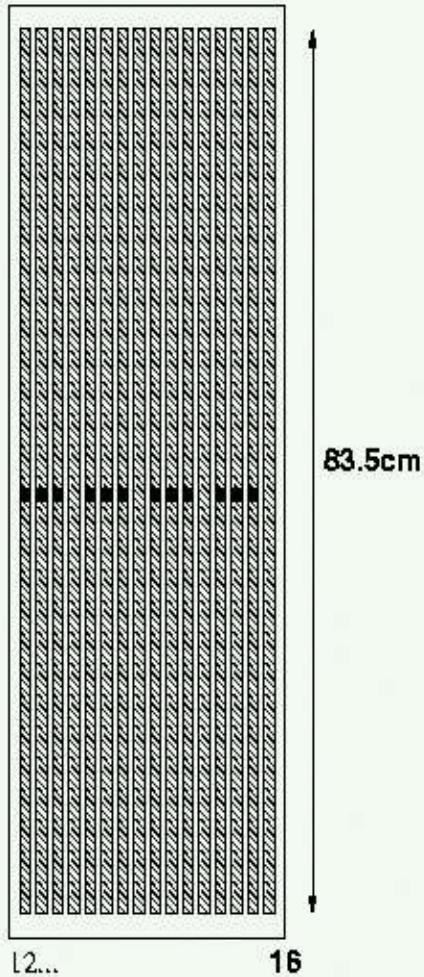
# Further ageing tests:measurements

## Motivation:

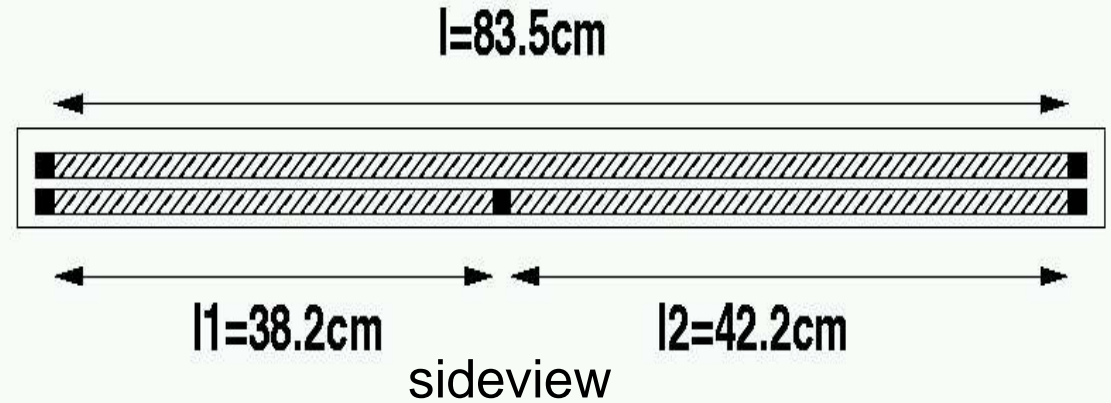
to verify ArCO<sub>2</sub> as our preferred gas mixture:

- irradiation with high energy X-rays and a low acceleration factor over a big area up to 2 fC.
- irradiation with highly ionising particles at the "Max Planck Institut für Kernphysik" with better statistics
  
- test of the LHCb gas system to search for possible problems with outgassing materials

# Further aging tests: modules



topview



**modules exactly like the 5m modules  
(materials, gluing...)**

- 2 layers à 16 straws
- irradiation of 1 layer

motivation:

- verify  $\text{ArCO}_2$  as preferred gas mixture
- more straws → better statistics
- irradiation of wire locaters, PCBs etc.