RPC R&D for the European DHCAL
IHEP, Protvino.

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Wednesday 12 September 2007

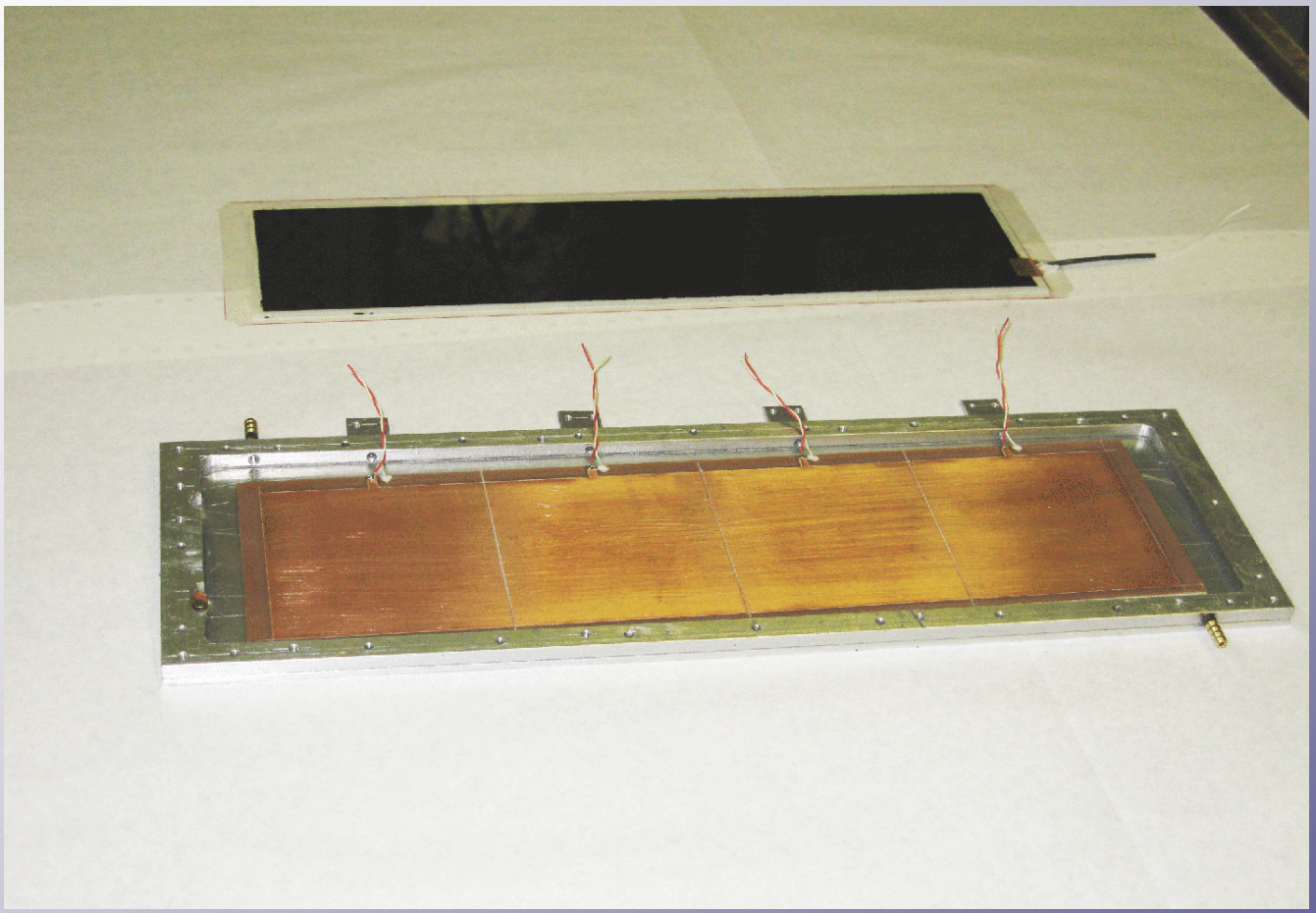
MAIN GOALS FOR THE NEAREST TIME:

-- Production of a set of chambers (8x32 cm2 active area) which been added with front-end electronics developed by IPNL,LAL,LLR will be tested with beam this year in mini DHCAL

-- 1x1 m2 RPC must be designed in a contact with French side and must be created by the end of 2007.

-- R&D work on an improvement of the RPC characteristics.

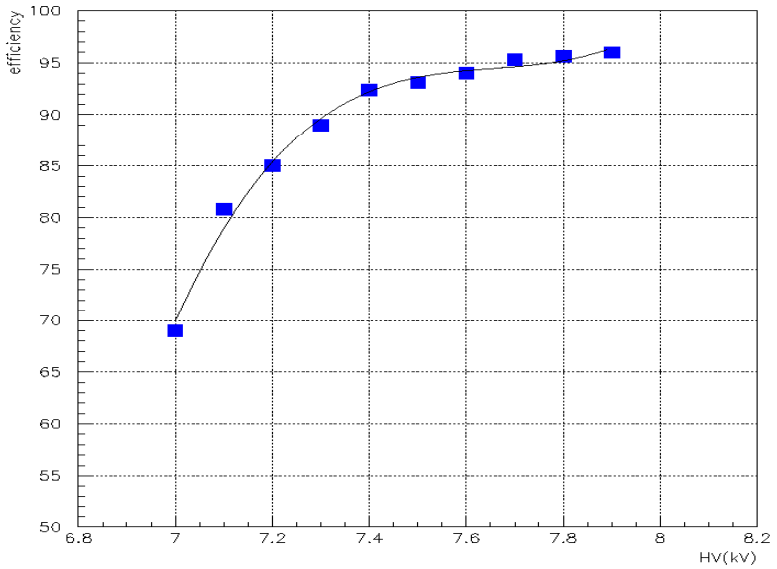
Preparation for mini DHCAL tests.

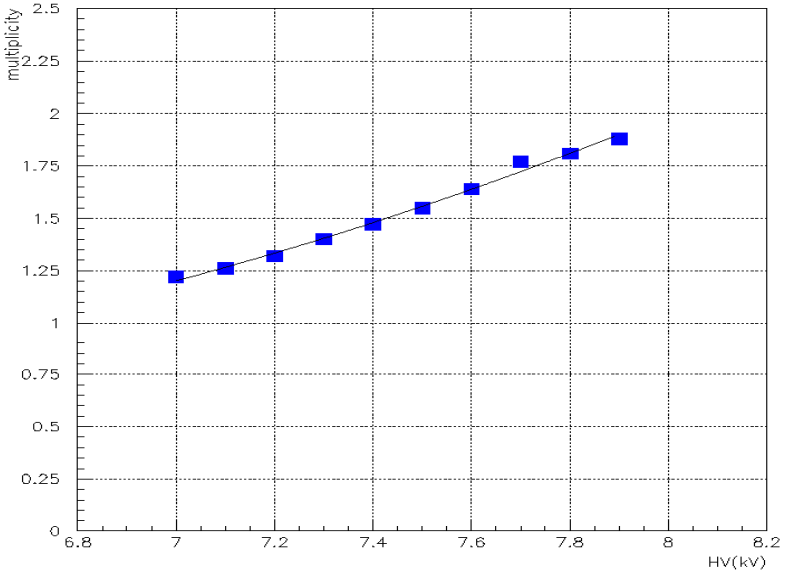


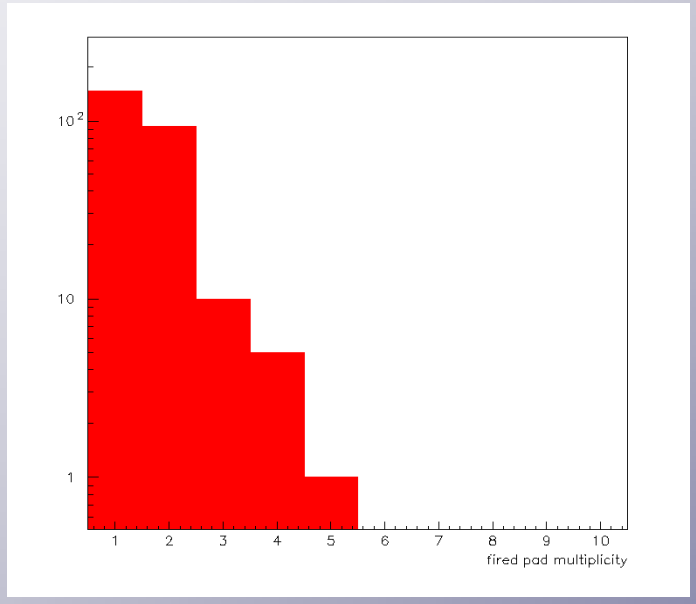
Aluminium case with 4 “big” anode pads inside and glass RPC having ~8x32 cm2 active area. 6 modules are already made.

Each box should be closed with PCB containing 4x32 read-out pads and front-end electronics.

Small size glass RPC with 1.2 mm gas gap is well studied detector

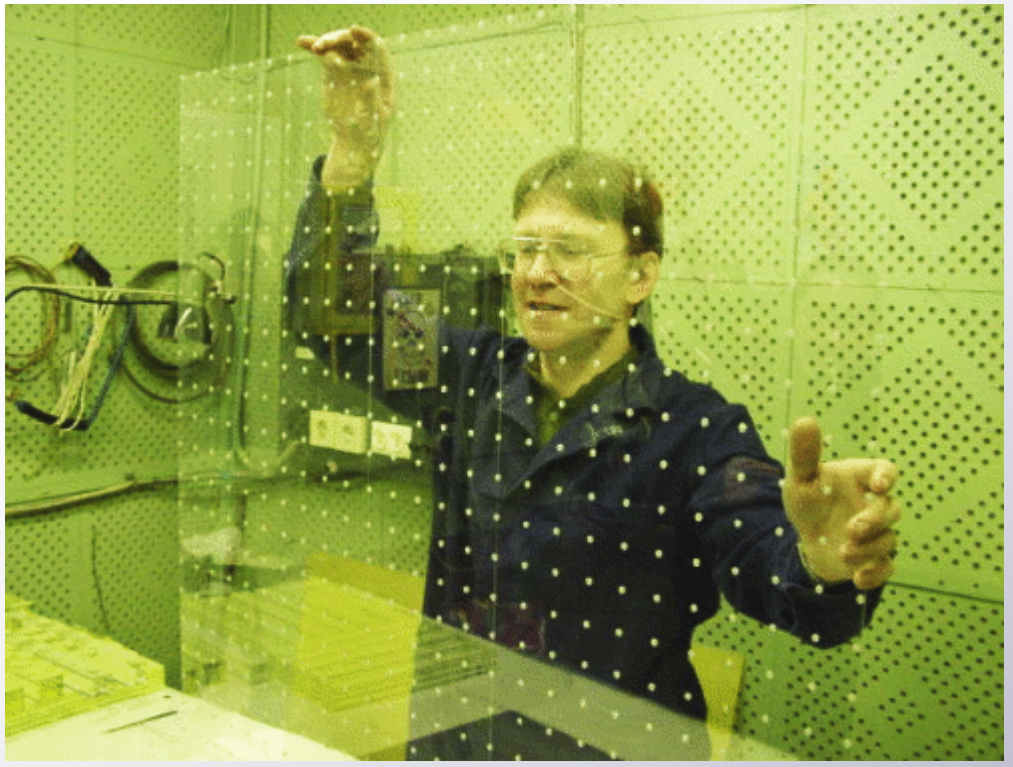






However, these results were obtained with small RPCs and with electronics installed rather at the detector, not on it. Very important to reproduce the data for large area chambers equipped with new front-end electronics.

Old setup of mini DHCAL at IHEP. To use it again?



Our experience in creation of large area glass RPC: 97x97 cm2

chamber made of 0.85mm and 0.55mm sheets with cylindrical spacers between them

Cosmic ray test

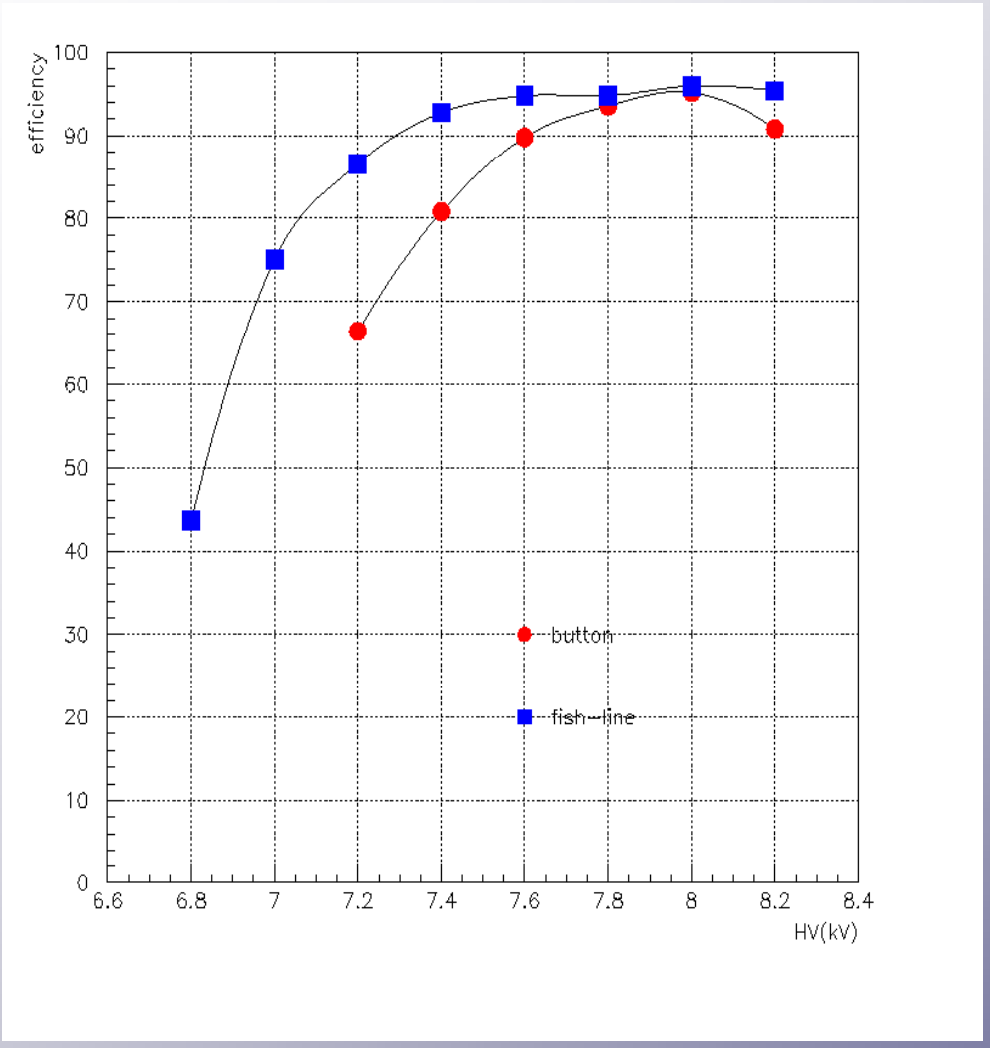
Gas mixture: TFE/IB/SF6=90/5/5

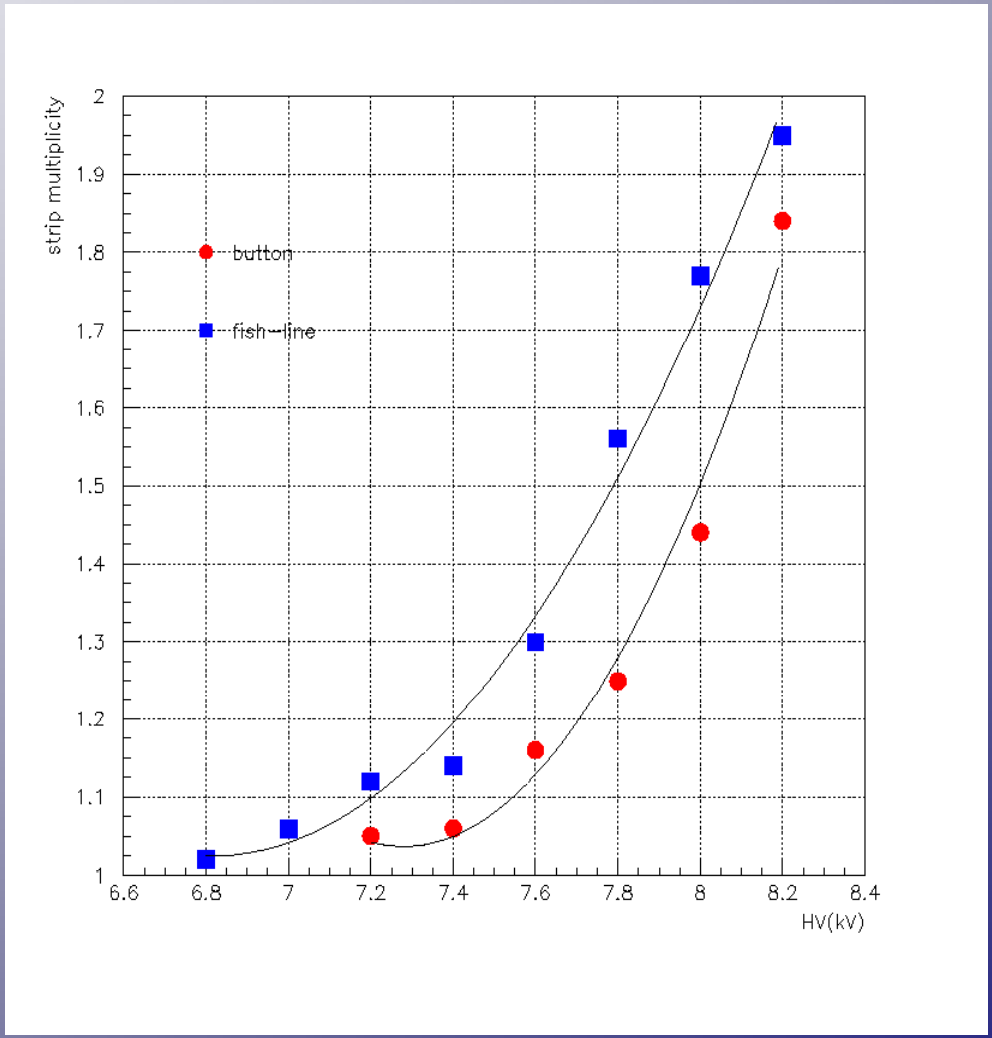
Efficiency ~94%

Non uniformity < 2%

Dark current ~ 1mkA/m2

Spacers: fishing-line instead of button





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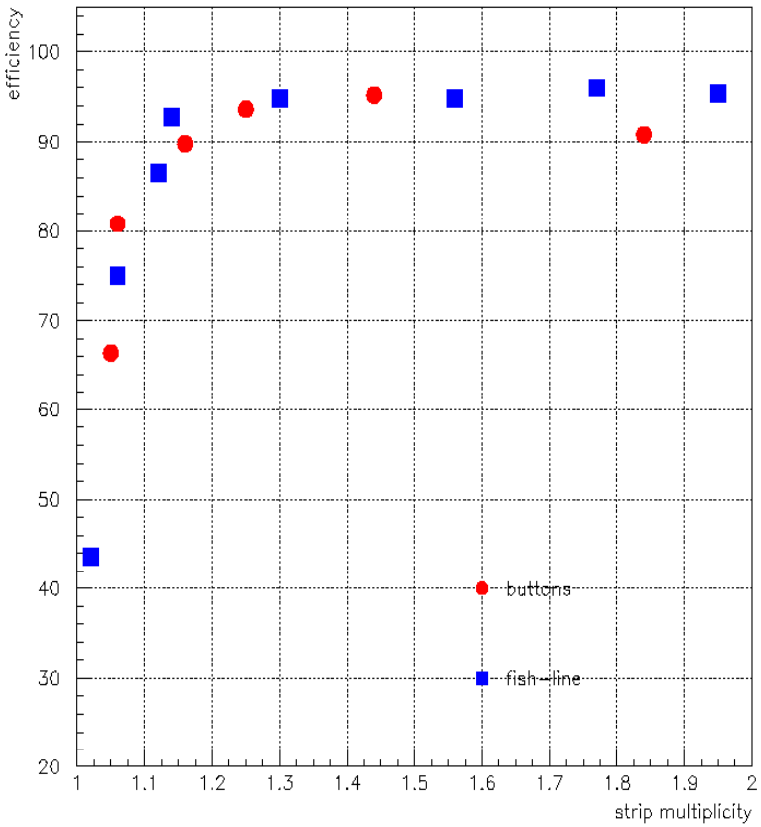
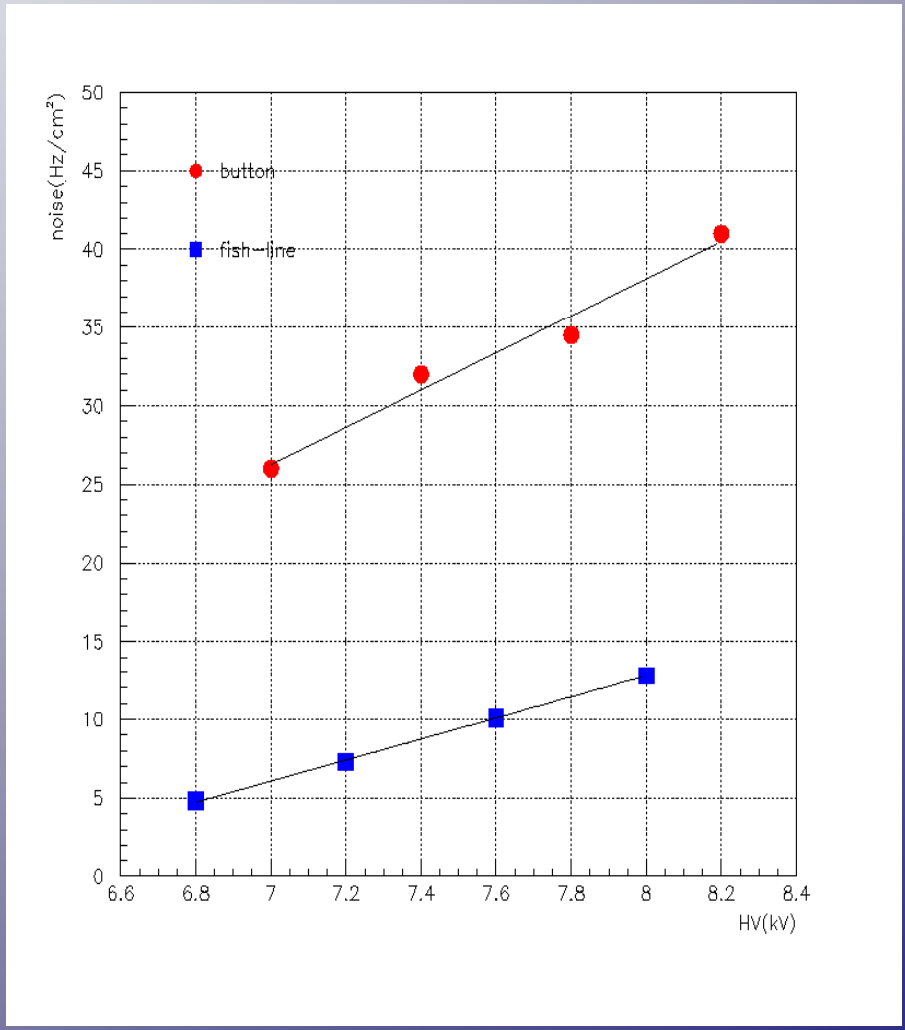
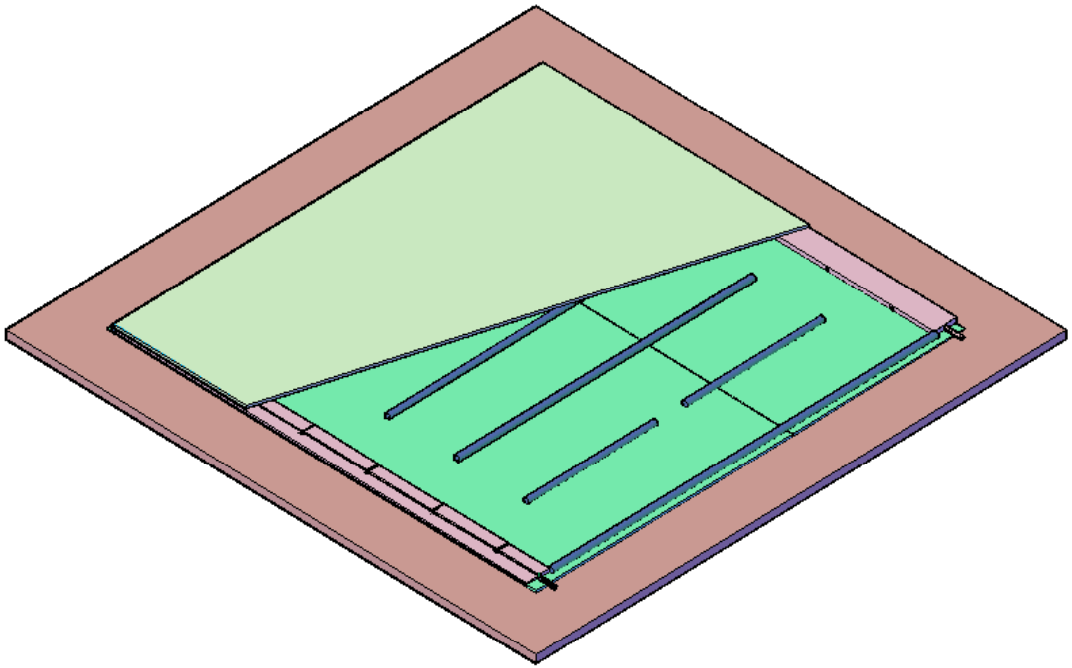


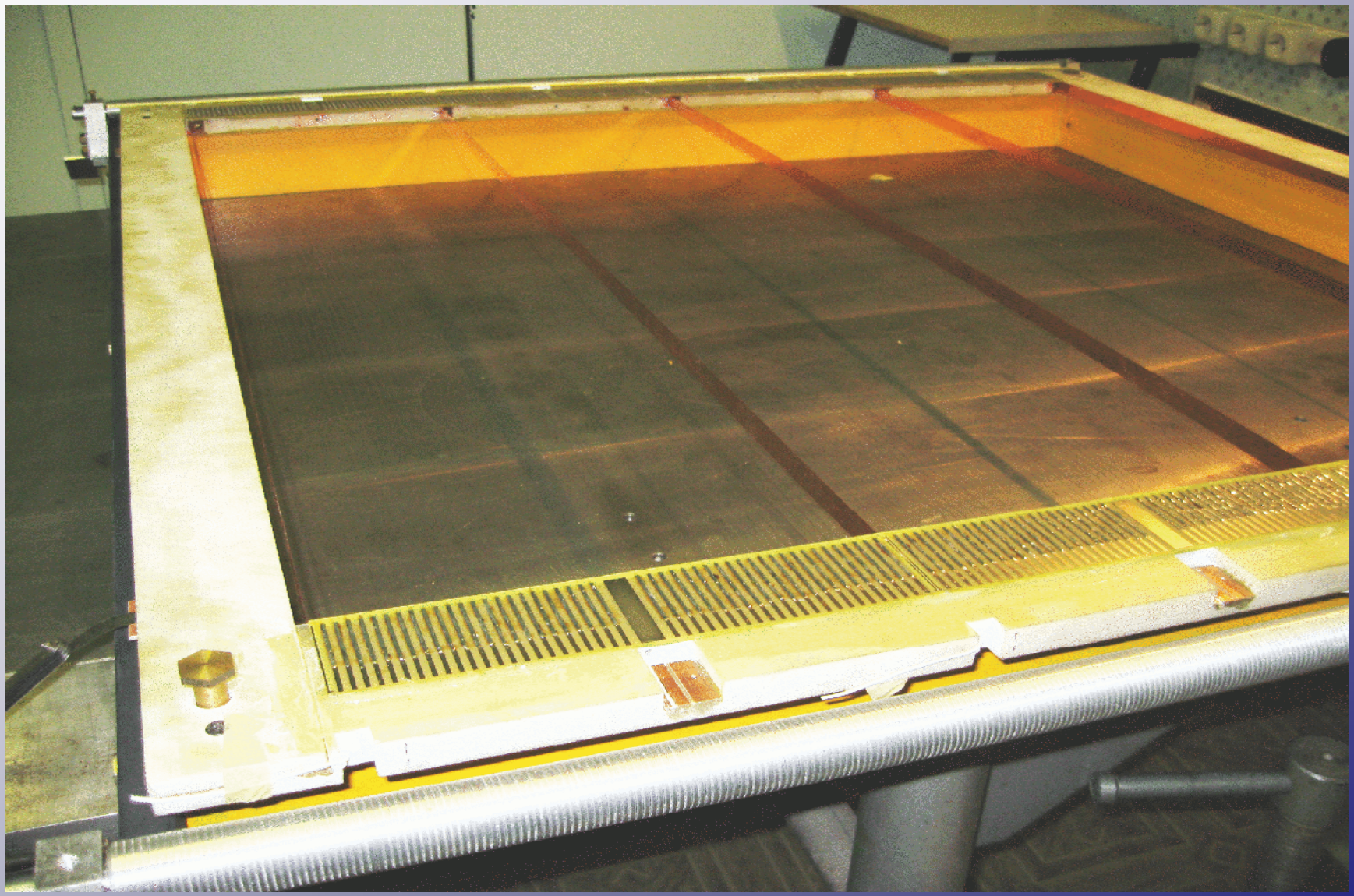


Main question in the large area RPC design is
how to perform gas tight volume in a case when
a chamber is assembled with few pieces of glass



Preparation for the 1x1 m2 RPC tests. Two 1x1 m2 scintillating counters created for the cosmic stend.

Preparation for the 1x1 m2 RPC tests. Photo of 1x1 m2 drift chamber (during assembling) which will be used in the cosmic stend.



COMBINED

RPC

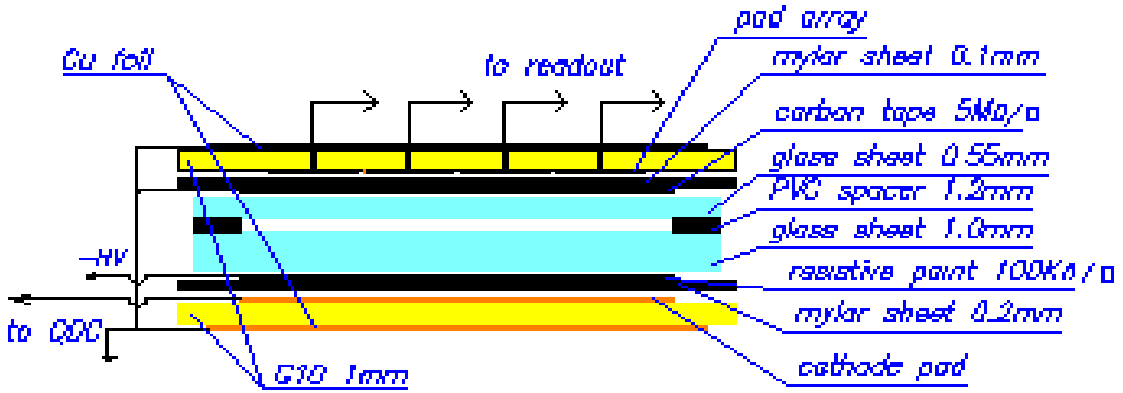


Fig.1a Standard glass RPC.

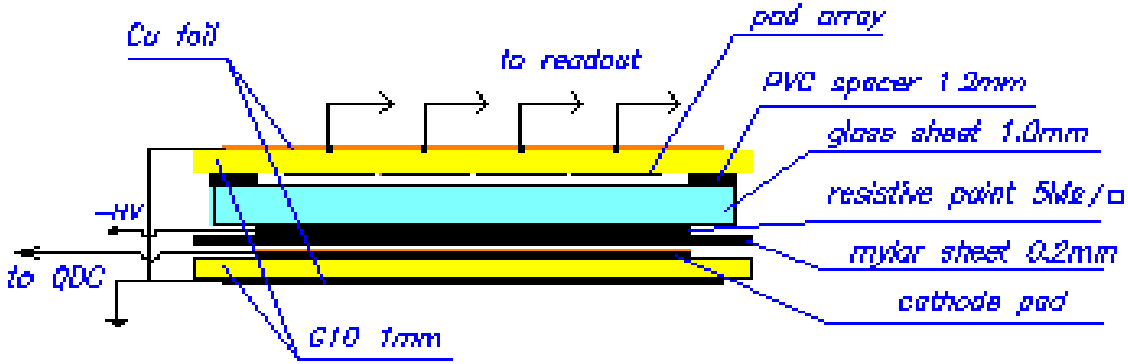


Fig.1b Combined RPC.

COMBINED

RPC

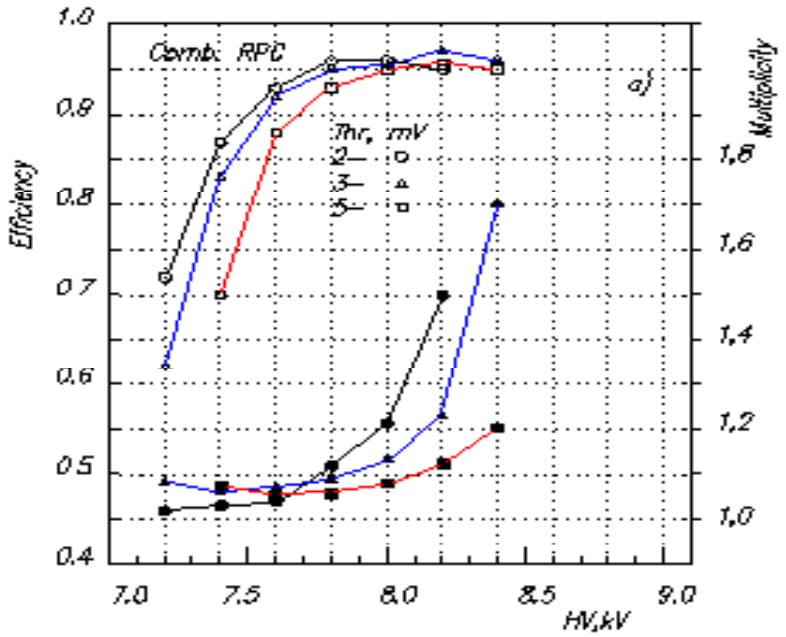


Fig. 3

COMBINED

RPC

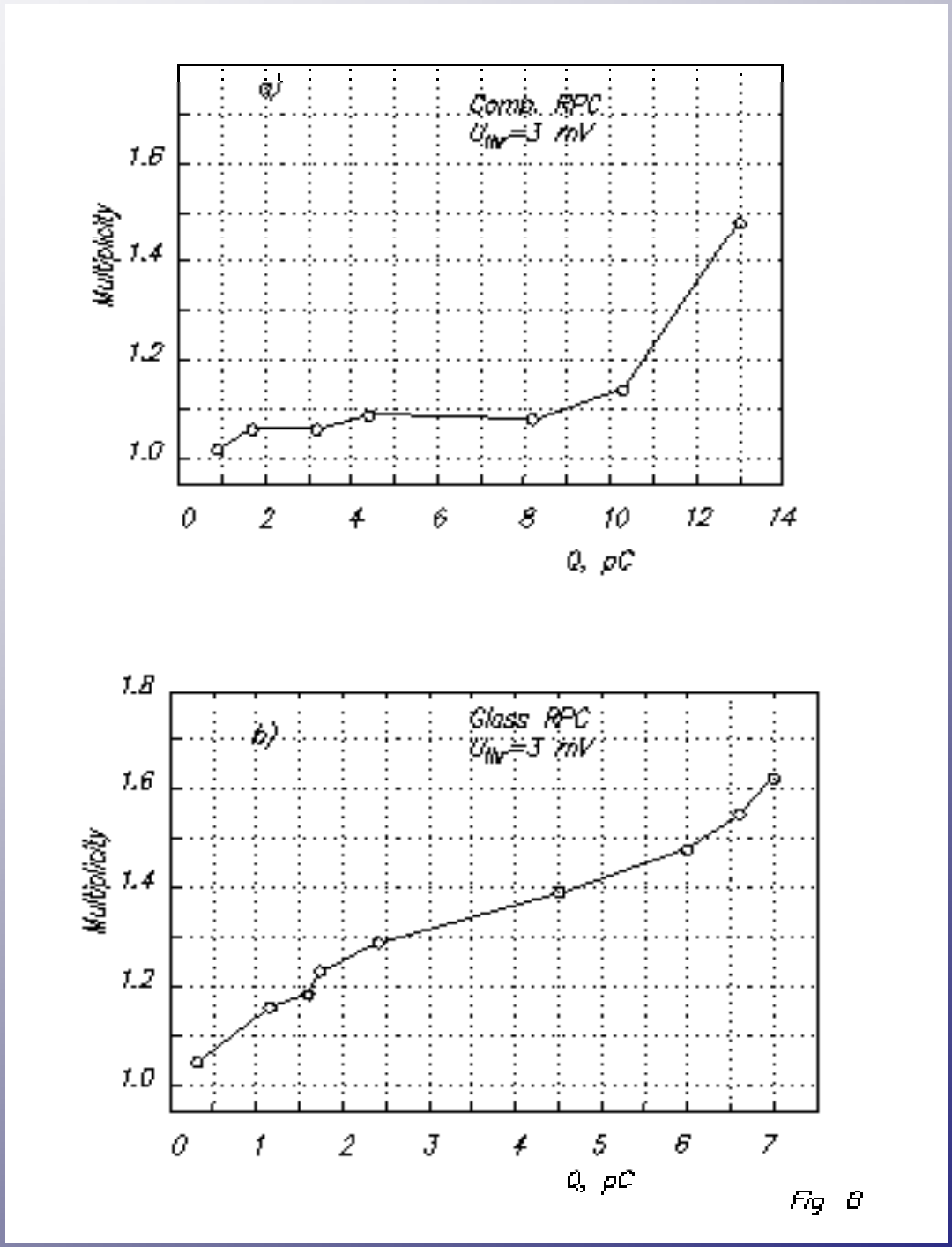
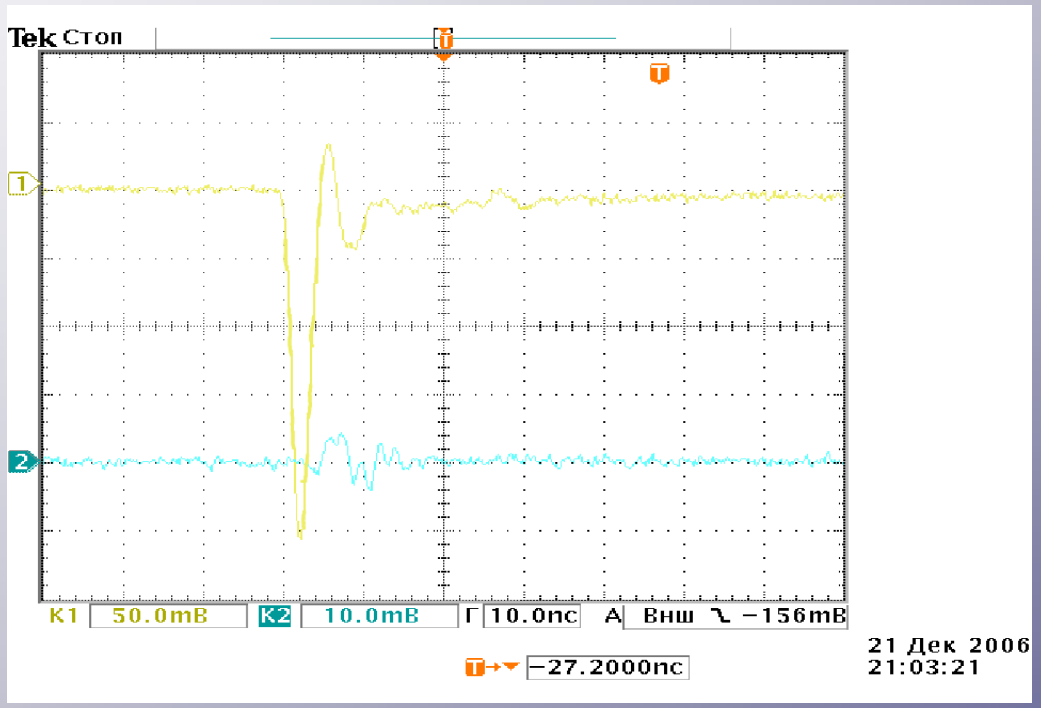


Fig 8

COMBINED

RPC



1. still no results on ageing
2. no data on how it works with spacers inside RPC