Summer 09 Testbeams SDHCAL prototypes

Kieffer Robert
IPNL
Lyon 16/09/09
kieffer@ipnl.in 2p3.fr

Introduction

Efficiency and rates studies, with small prototypes will permit us to find the best solutions in order to build high performances 1m^2 detectors.

A new proposition has been tested on beam this summer:
Gaseous Resistive Plate Chamber using semi-conductive glass.

Beam Time

First period:

PS T9

18June to 8July

Master setup: small chamber

Slave setup: 1m^2 prototype

Gamma quencher:
Co_2/Isobutane

Second period:

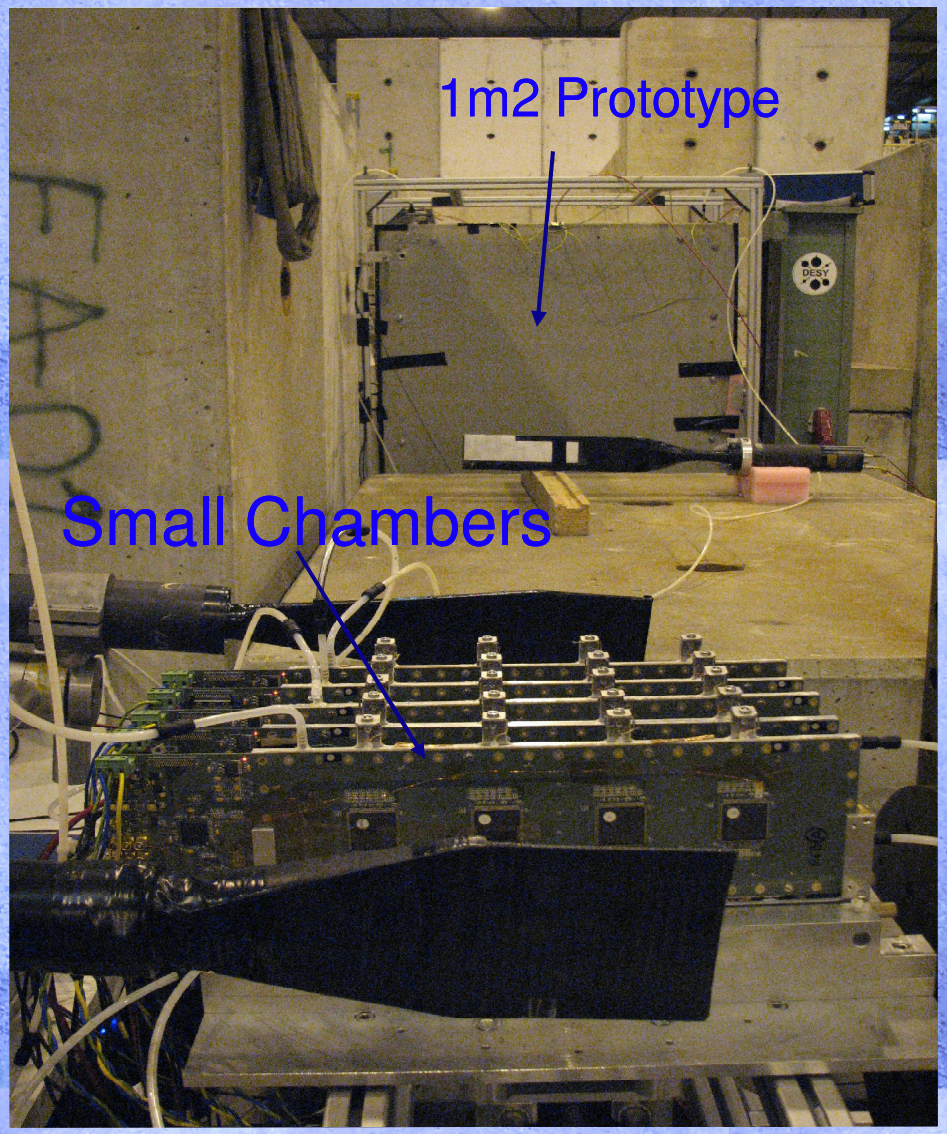
SPS H4

31Jully to 7August

Master setup: 1m^2 prototype

Slave setup: small chamber

Gamma quencher: CO_2

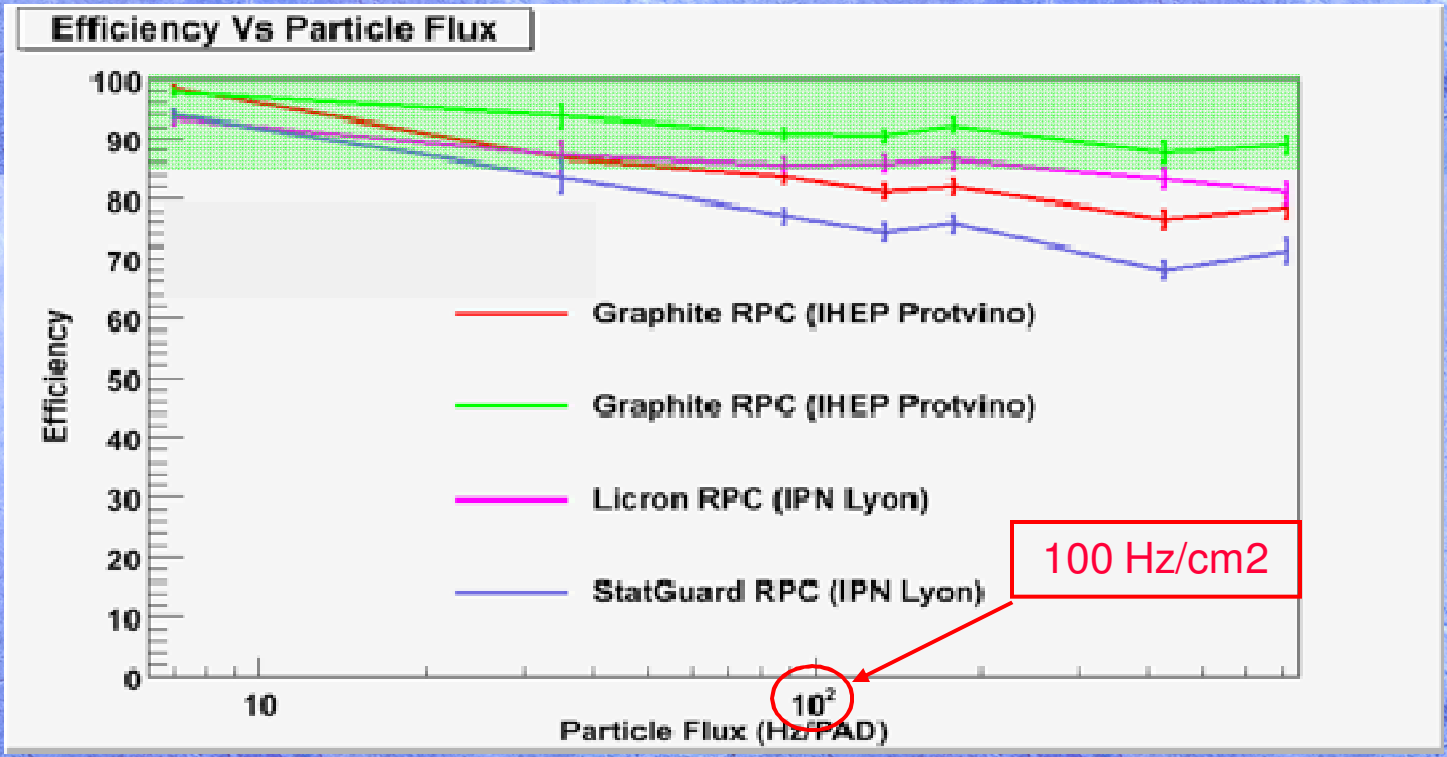


Starting point

First rates studies using classical float glass detectors:

Resistivity: 10^{13} ohm.cm

Data taken at CERN last year (summer 08)



Efficency decrases a lot for hight rates!

The semi-conductive GRPC

Starting a colaboration with the Tsinghua University, they provide us 10^{10}ohm.cm semi-conductive glass.

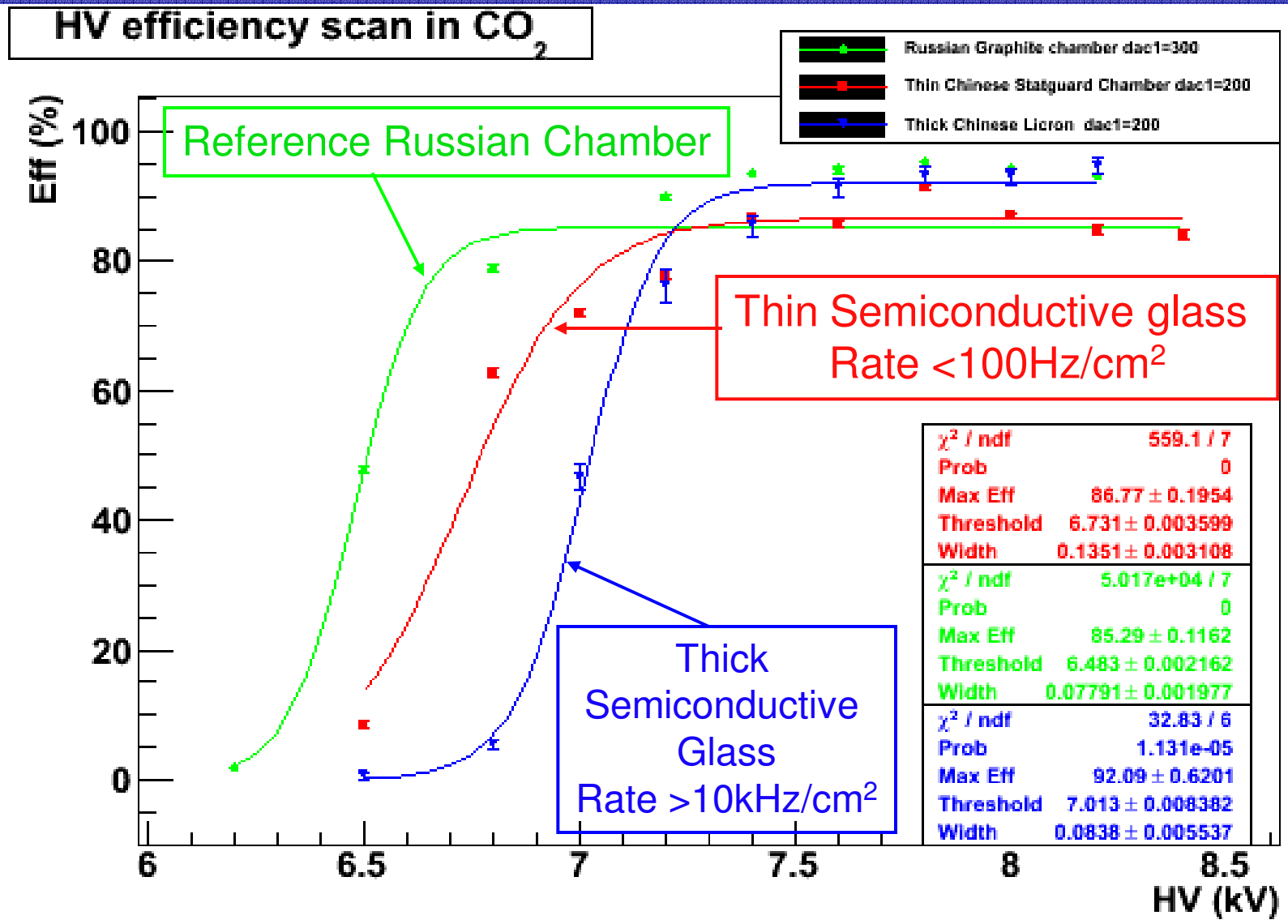
We build two small chambers to make some tests:

- Glass size: 6x28cm^2
- Glass thickness: (0.83mm / 1.1mm)
- Gas gap: 1.2mm

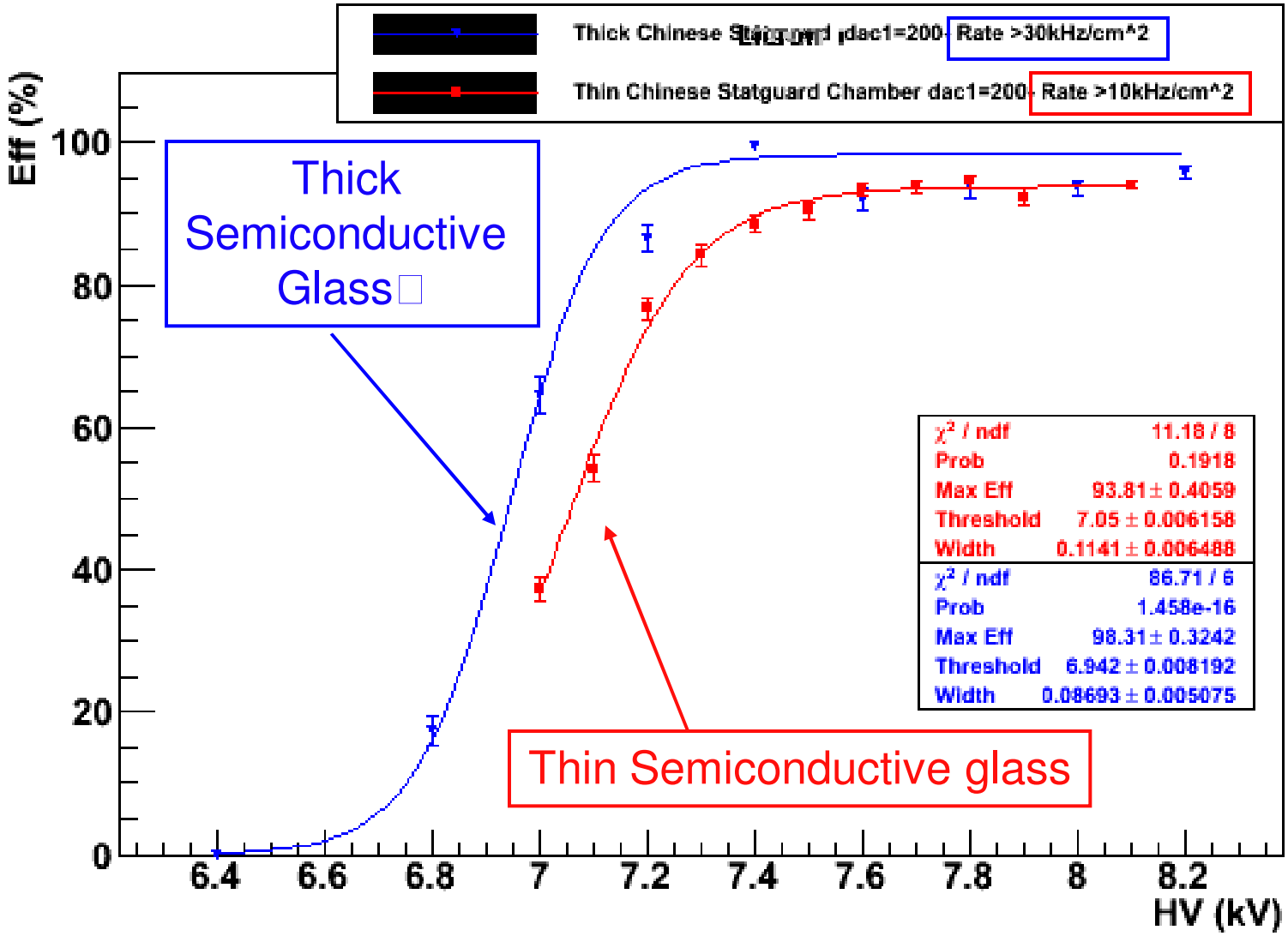
✓One chamber uses 1.1mm plates each side, being coated with licron.

✓Second chamber has a 0.83mm plate on the readout side, and 1.1mm plate on the cathode side, with a statguard coating.

Efficiency vs HV using CO2

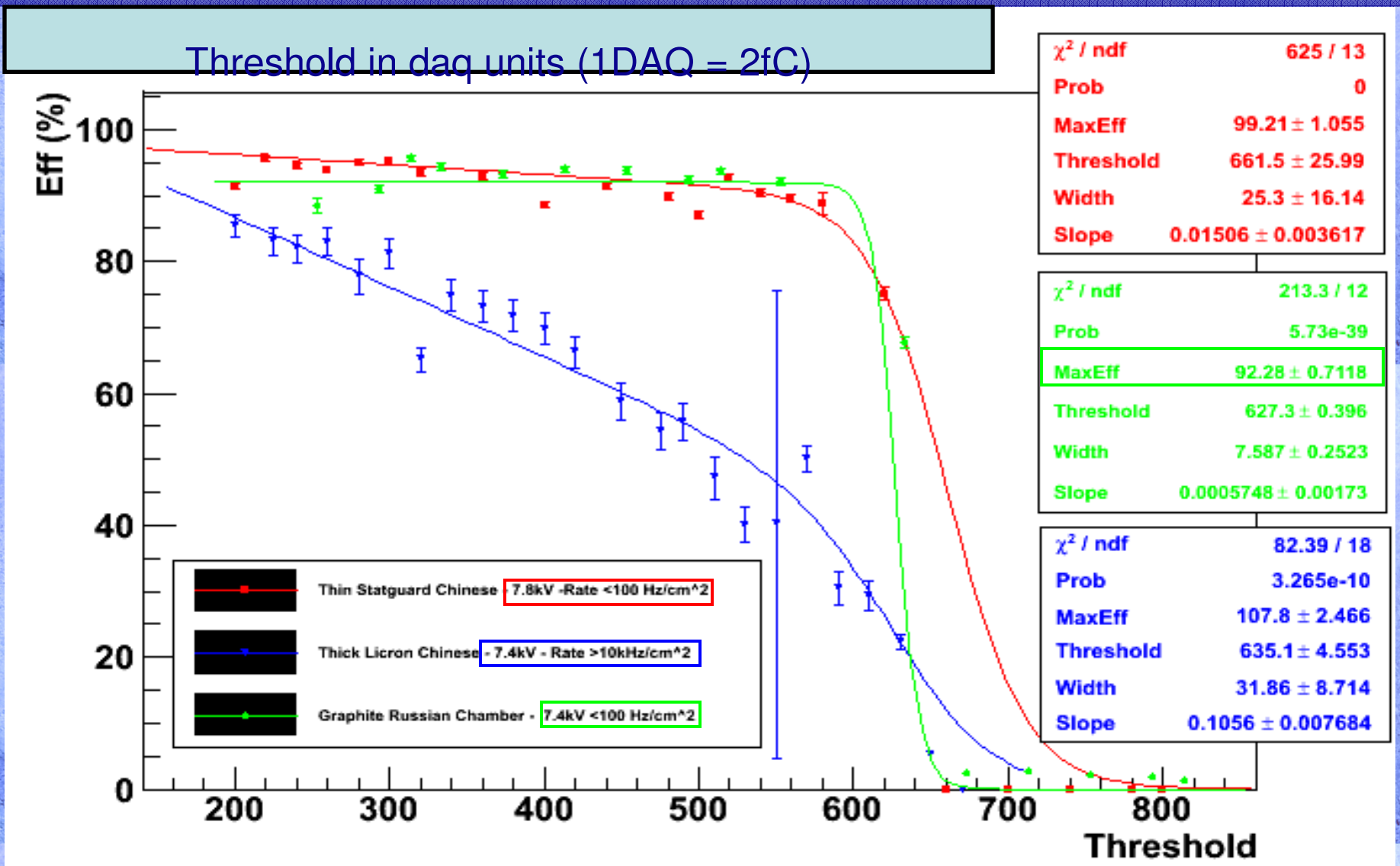


Efficiency vs HV using Isobutane

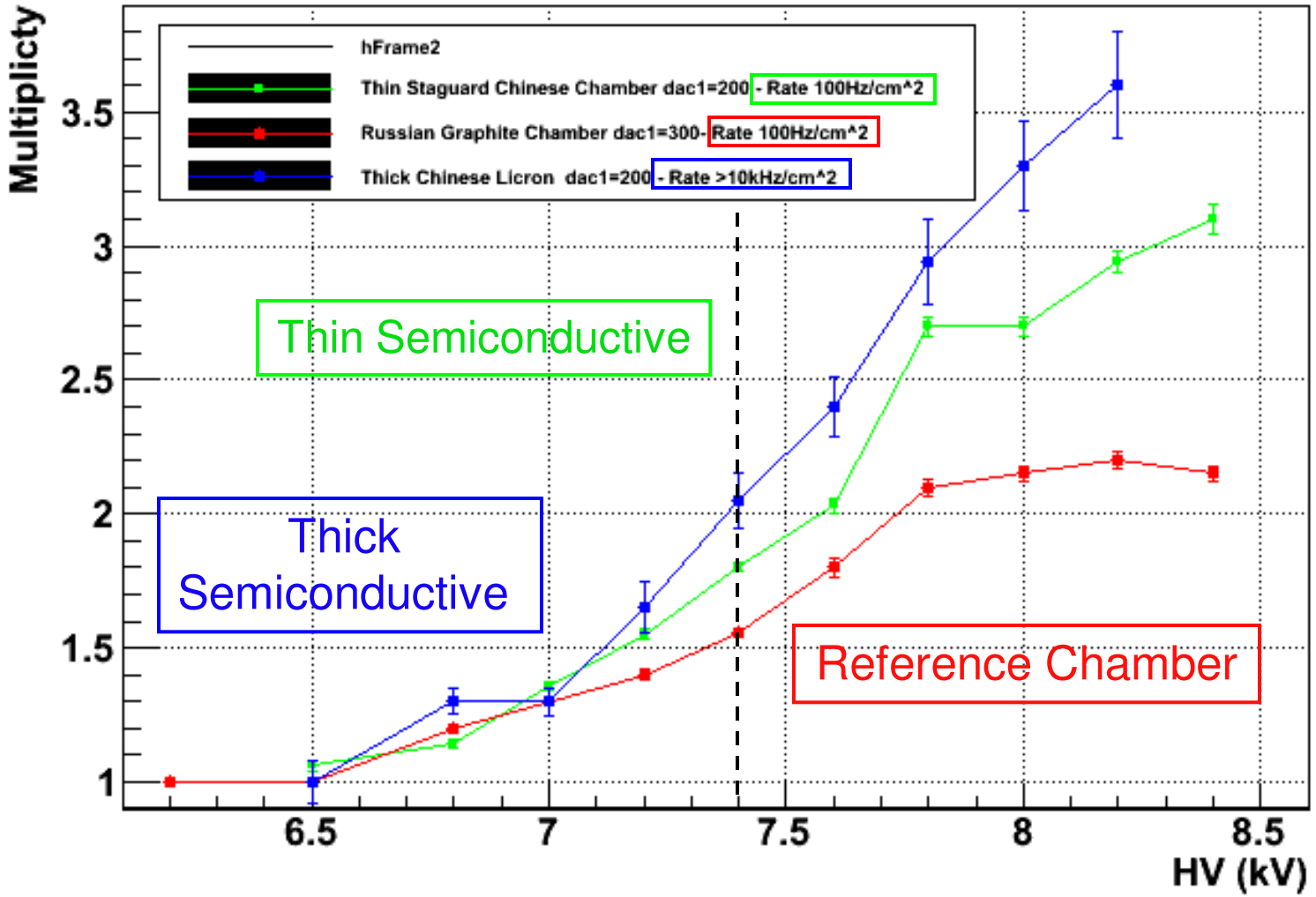


Efficiency vs Threshold (CO2)

Threshold in daq units (1DAQ = 2fC)



Multiplicity vs HV (CO2)



Conclusion & Outlook

- Semi-conductive glass shows good efficiency even at hight rates (>10kHz)

- The maximum available size is 30x30 cm^2 for now.

- We start a collaboration with the Tsinghua University, and we are working on to get 1m2 semi-conductive glass as soon as possible.

- Then we could obtain a huge improvement on the 1m3 prototype capabilities.

Thanks for your attention.