RPC Upgrade

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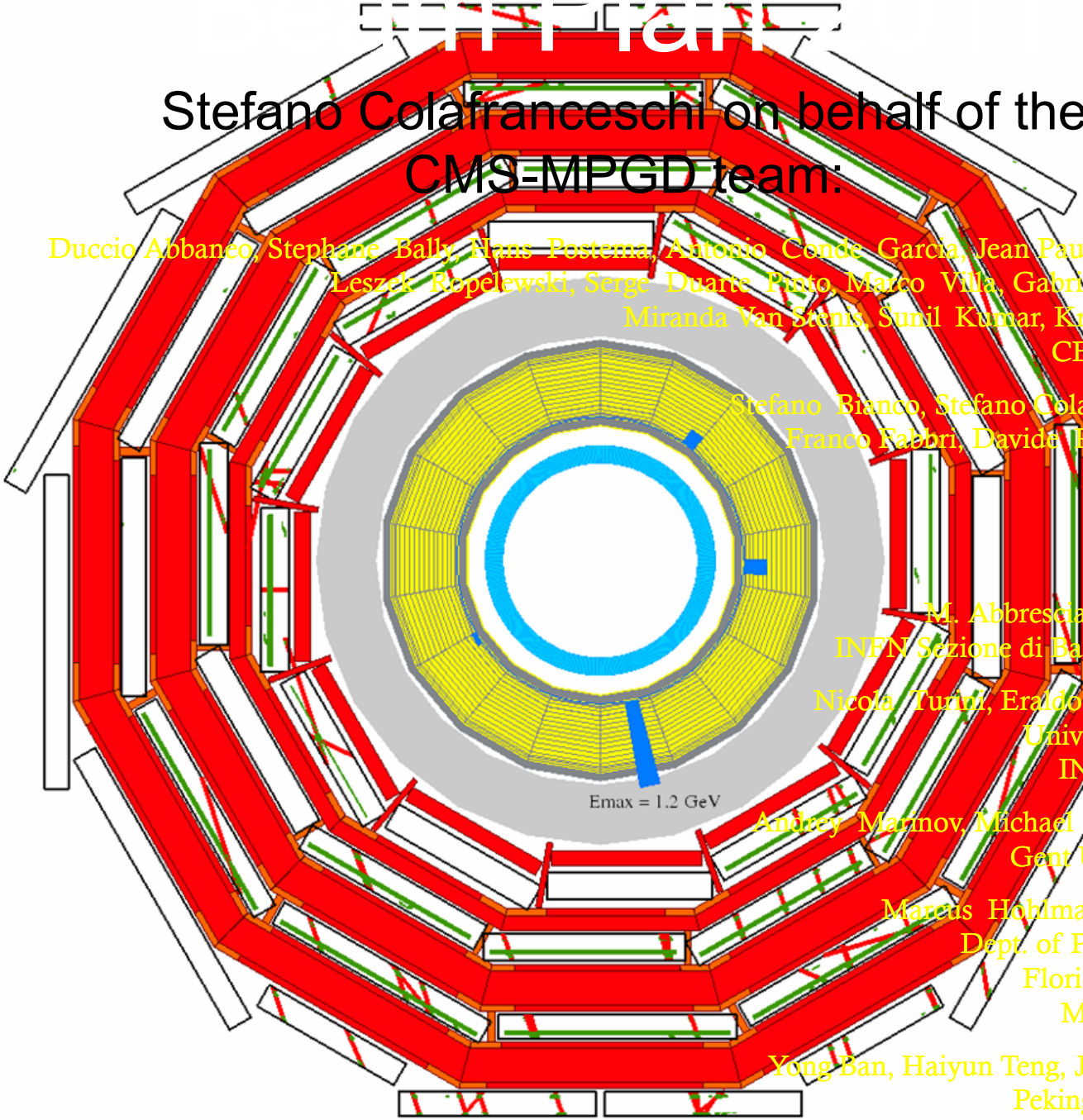
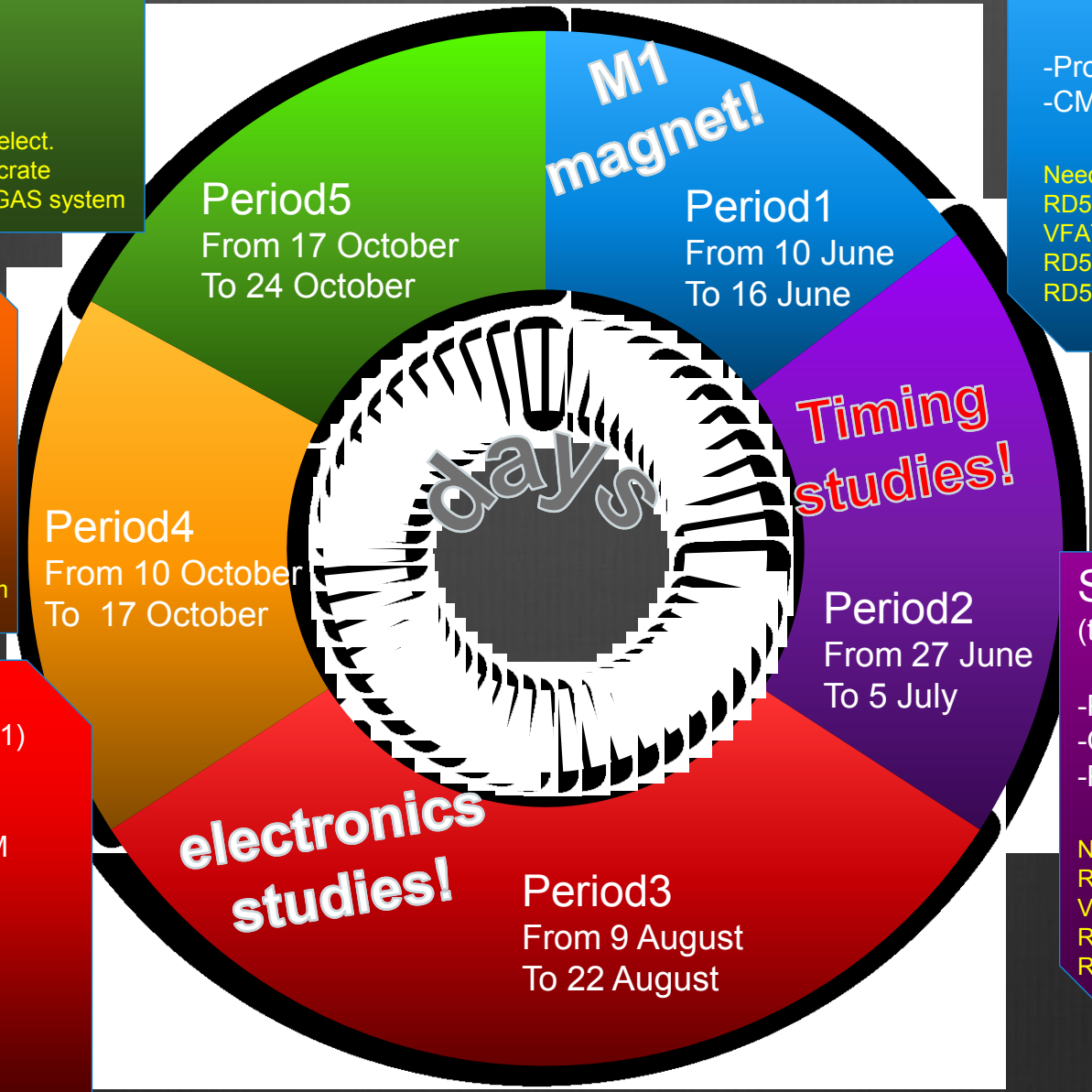


Periods Overview



SPS-H4
(together with RD51)

-Proto IV (?)

Needed:
RD51 tracker
VFAT+TURBO elect.
RD51 DAQ pc+crate
RD51 portable GAS system

SPS-H2

-Proto_II
-CMS_timing_GEM

Needed:
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SPS-H4
(together with GSI)

-Proto IV (?)

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SPS-H4
(together with RD51)

-Proto_II
-CMS_timing_GEM
-Proto_III

Needed:
RD51 tracker
VFAT+TURBO elect.
RD51 DAQ pc+crate
RD51 portable GAS system

SPS-H4
(together with RD51)

-Proto_II
-CMS_timing_GEM
-Proto_III
-Proto VI (?)

Needed:
RD51 tracker
VFAT+TURBO elect.
RD51 DAQ pc+crate
RD51 portable GAS system

Detector summary

built

CMS_timing_GEM: Double mask 10x10cm^2 1D readout (3/2/2/2);
256 channels

built

CMS_Proto_I: Single mask FULL_SIZE 1D readout (3/2/2/2);
1024 channels

in construction

CMS_Proto_II: Single mask FULL_SIZE 1D readout (3/1/2/1);
8192channels

built

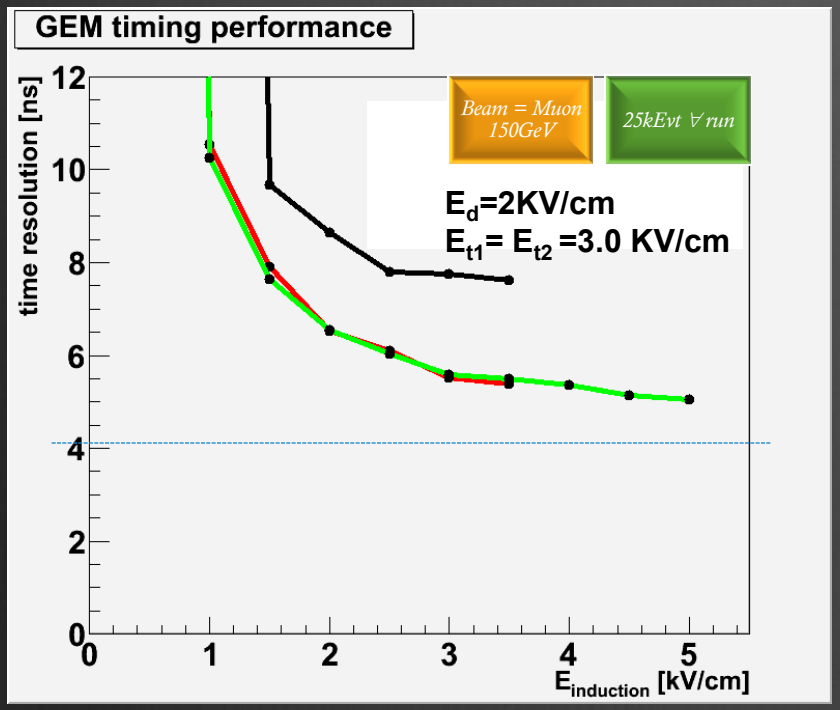
CMS_Proto_III: Single Mask 10x10cm^2 [N2] (3/1/2/1);
256 channels

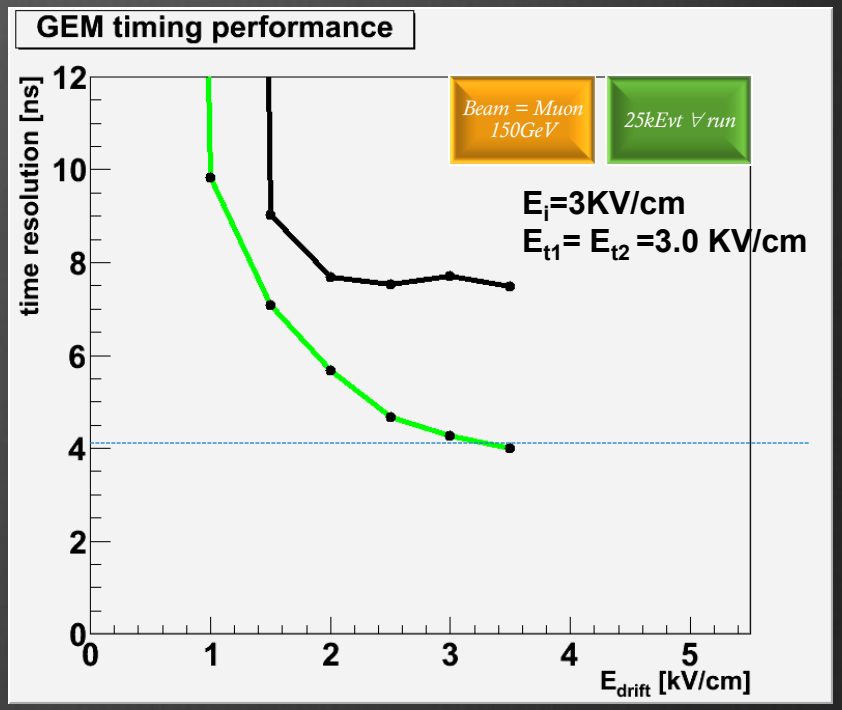
scheduled

CMS_Proto_VI: Single Mask FULL_SIZE 1D [N2] (3/1/2/1)
8192 channels

Some results from 2010, timing studies…

Reached time resolution of 4ns !



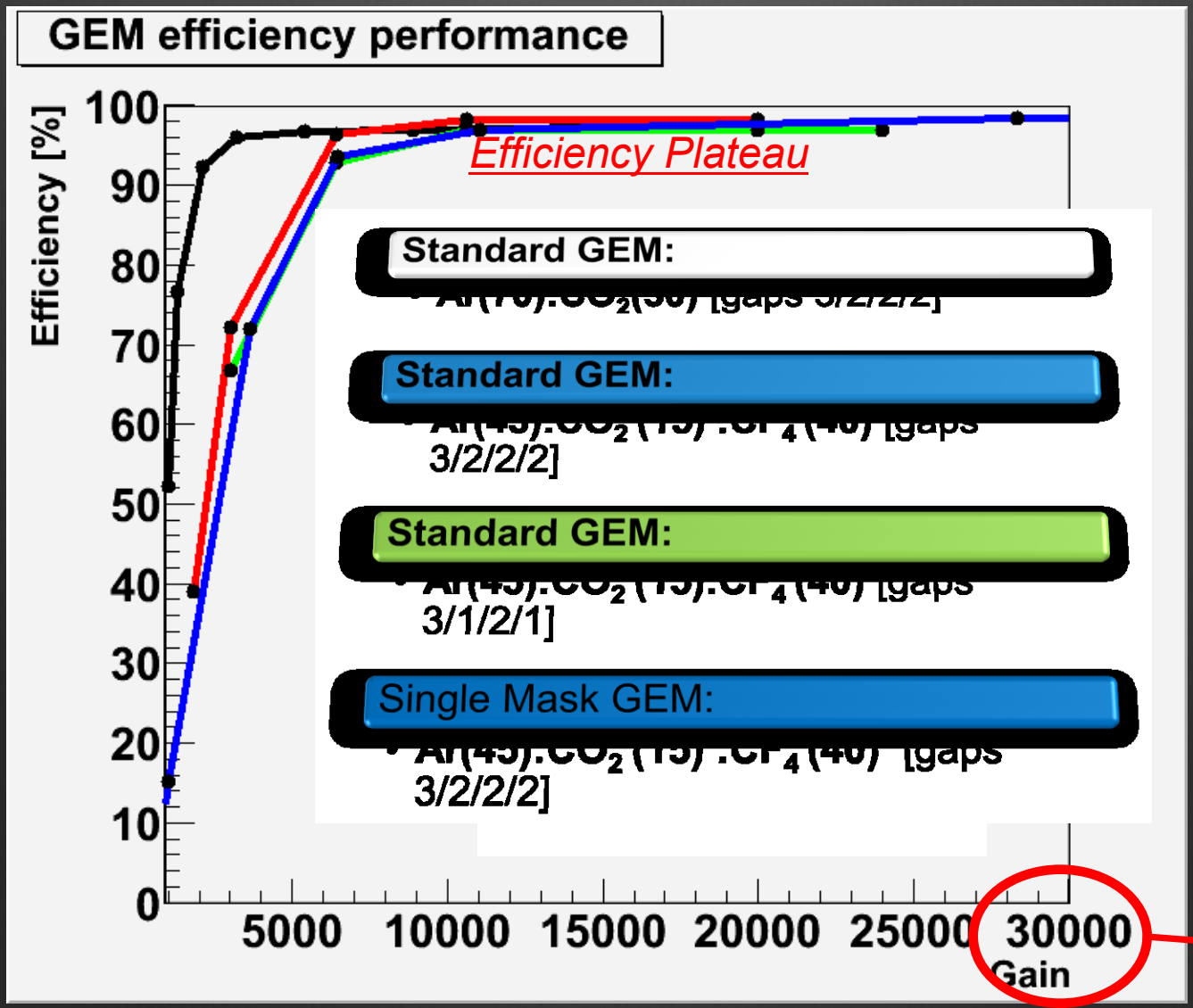


Standard GEM
- **Ar(70):CO_2(30)**
- [gaps 3/2/2/2]

Standard GEM
- **Ar(45):CO_2 (15) :CF_4(40)**
- [gaps 3/2/2/2]

Standard GEM
- **Ar(45):CO_2 (15):CF_4 (40)**
- [gaps 3/1/2/1]

The single mask performance



MSPL=4 (100ns)

VFAT thr = 25

Beam = Muon 150GeV

25kEvt ∀ run

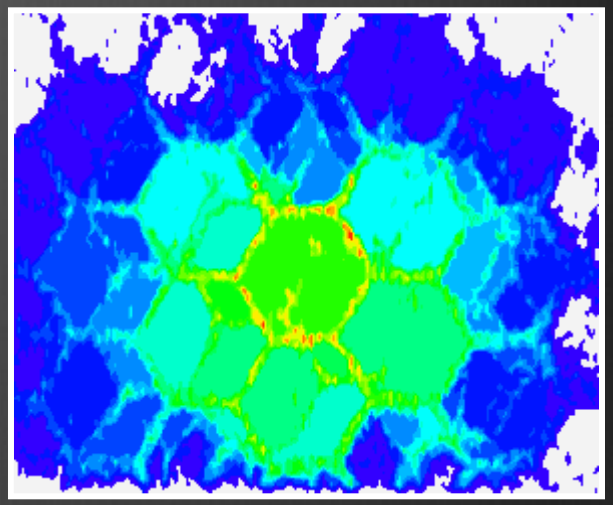
High achievable gain!

Honeycomb structure inside the detector?

Honeycomb size

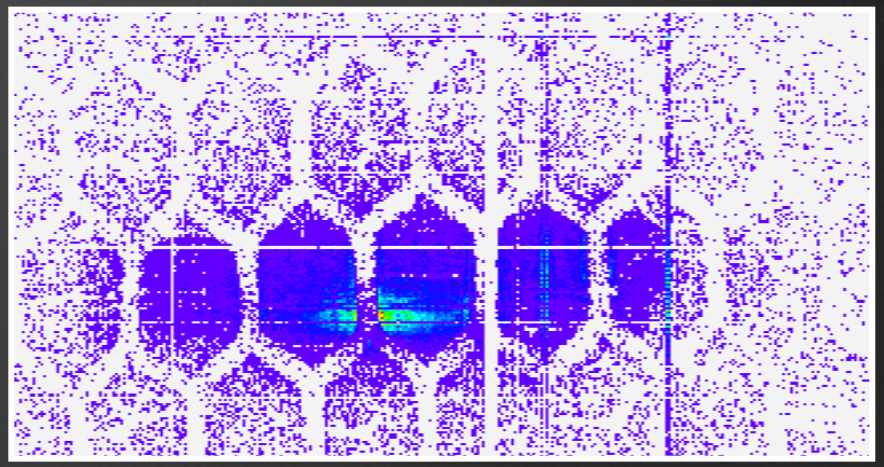
CONFIG. 1:
12mm(Drift)
12*mm*(T1),
12*mm*(T2)
12*mm*(Induction)

Efficiency=50%
(data taking affected by grounding problem)



CONFIG. 2:
6mm(Drift)
12*mm*(T1)
12*mm*(T2)
12*mm*(Induction)

Efficiency=70%
GEOMETRIAL FACTOR rough est. 65%

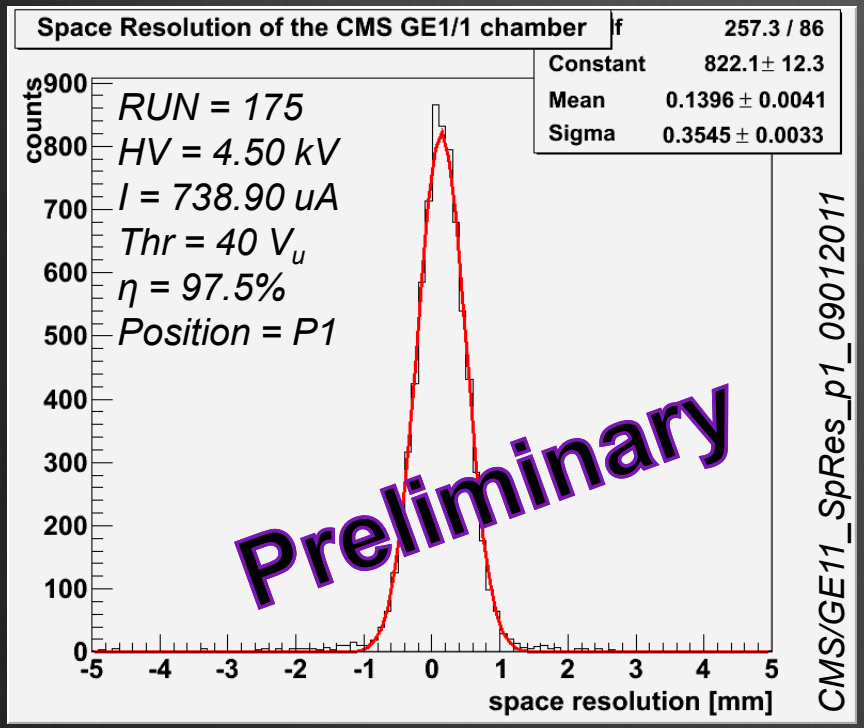


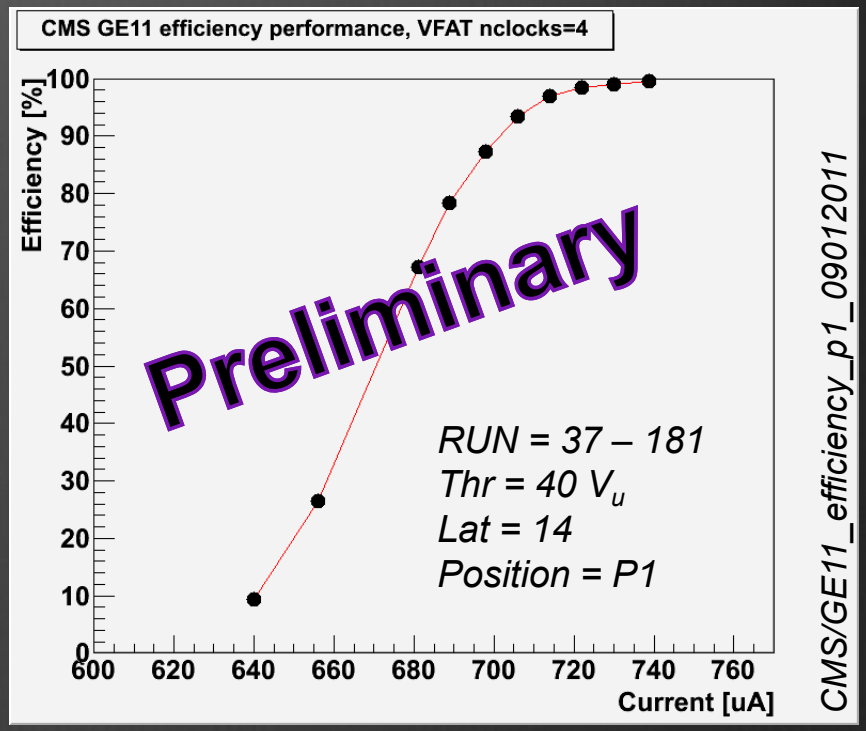
CONFIG. 3:
6*mm*(Drift)
∅*mm*(T1) ,
∅*mm*(T2)
∅*mm*(Induction)

Efficiency=70%

For RPC spacers take up more than 5% area
(1cm circular spacer every 10cm)

GE1/1 Prototype in details: last TB
CMS_Proto_I

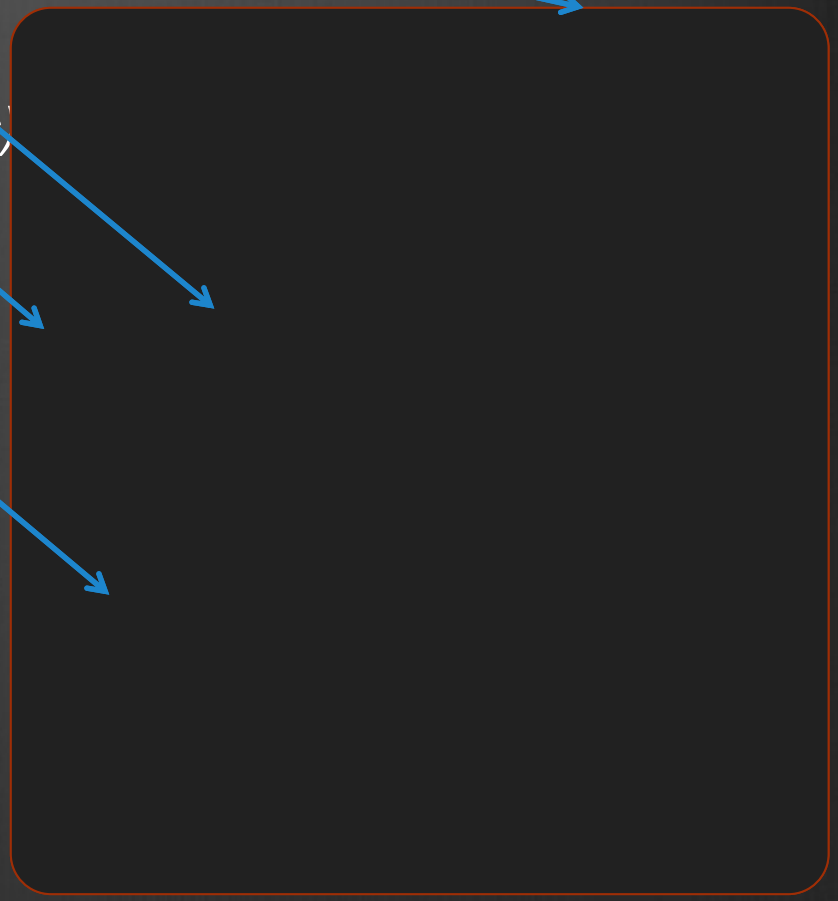




Data-taking focused on different points along the GE1/1.
Preliminary results show good performance.

Some software development…

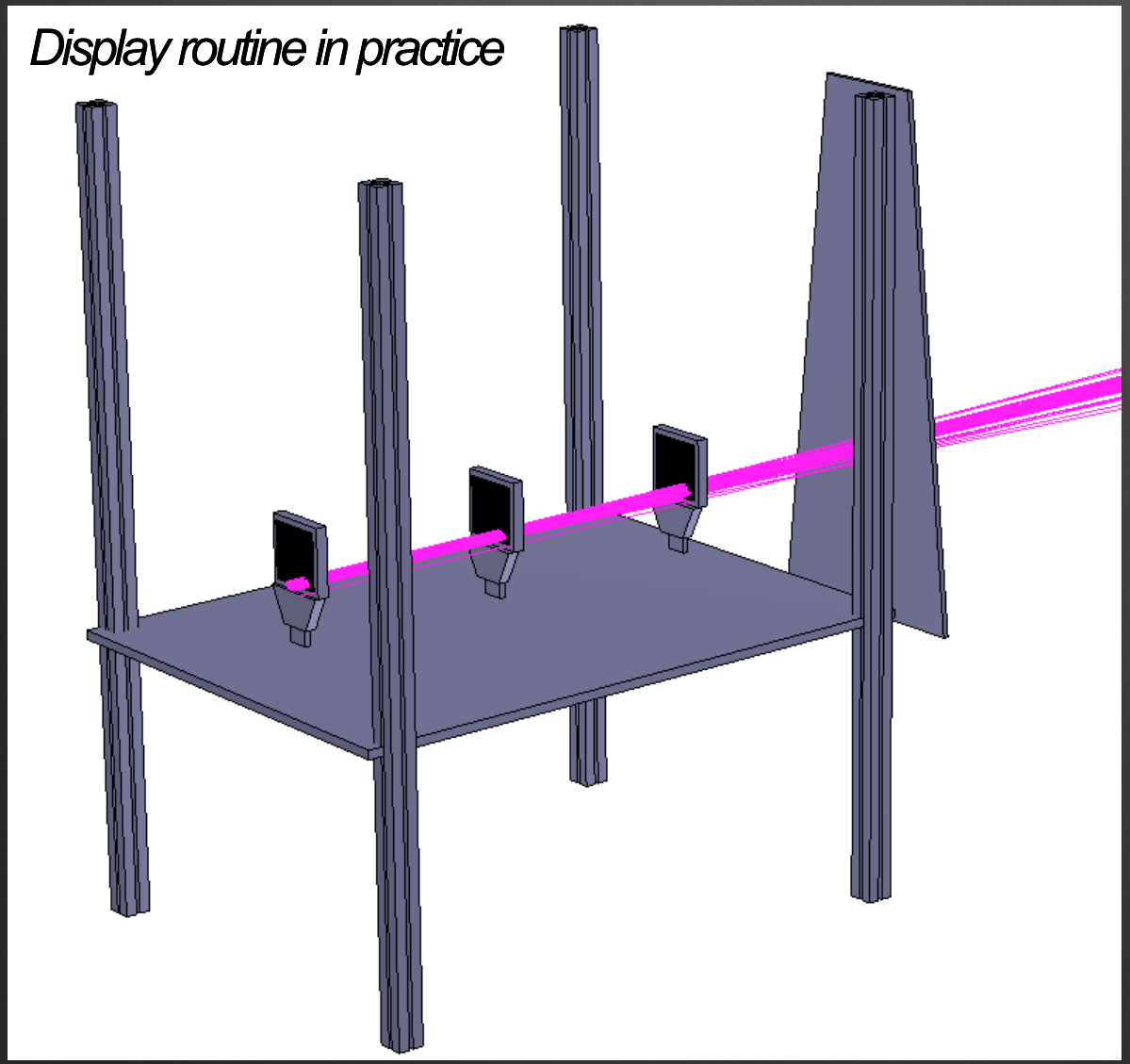
- *The software has been upgraded.*
  - *New configuration utility*
  - *New functions for efficiency and space resolution*
  - *New geometry definition*
  (for variable pitch and non parallel strips)
  - *New 3D-Event Displayer*



GE1/1

- *Efficiency along the chamber is > 98%*
- *Space resolution ≈ strip / sqrt(12)*

Just an example!



RUN_DESCRIPTION

RUN = 657
HV = 4.3 kV
Thr = 95 V_u
Lat = 15
MSPL = 4
CMS_GE11 = p5

TRACKER PARAM.

Trk1 HV = 4.5 kV
Trk2 HV = 4.4 kV
Trk3 HV = 4.4 kV

Trk1 I = 729.2 uA
Trk2 I = 731.1 uA
Trk3 I = 723.7 uA

Thr 1,2,3 = 40 V_u

THANKS!

…Looking forward for a lots of beam…