

# GEM Industrialisation Plans with Korea CMS

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# Industrialisation Plans

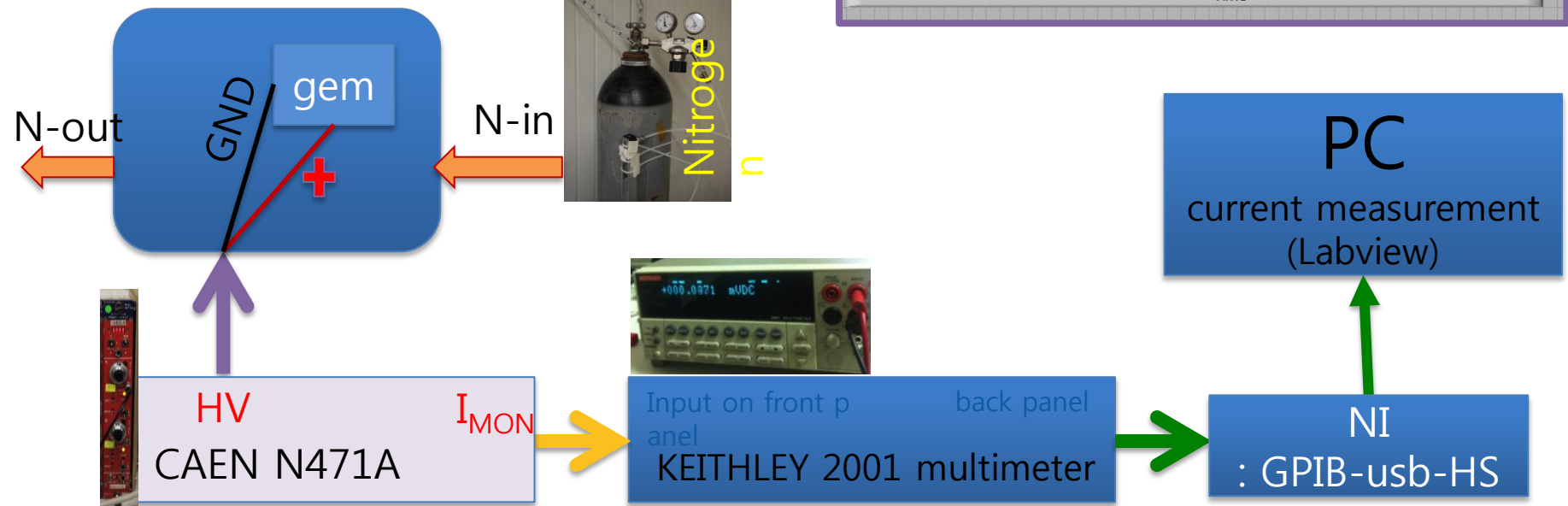
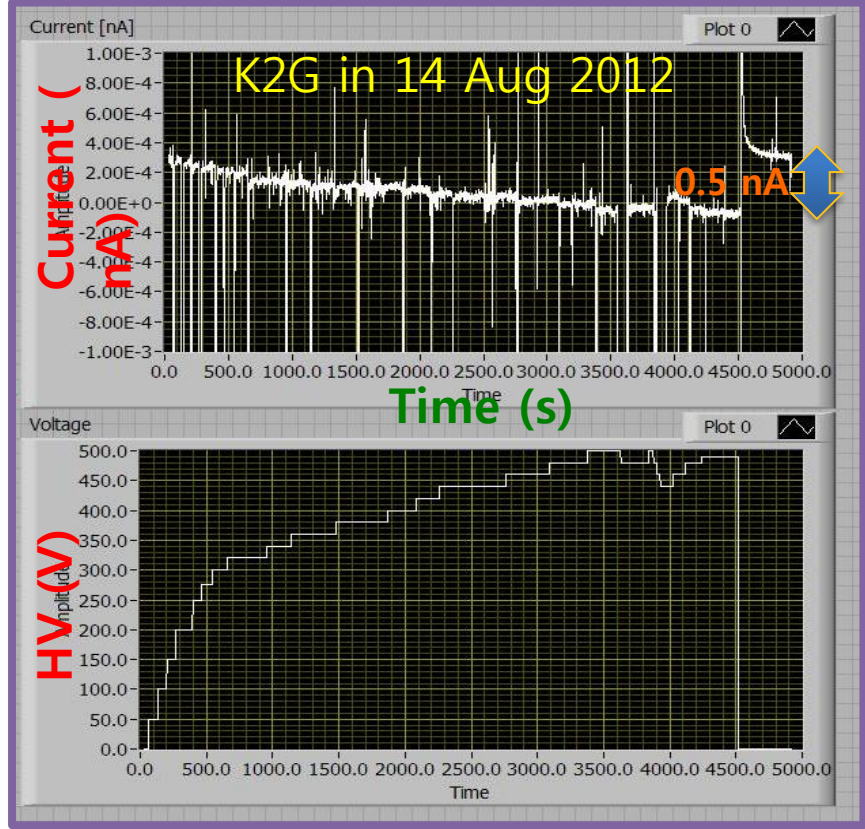
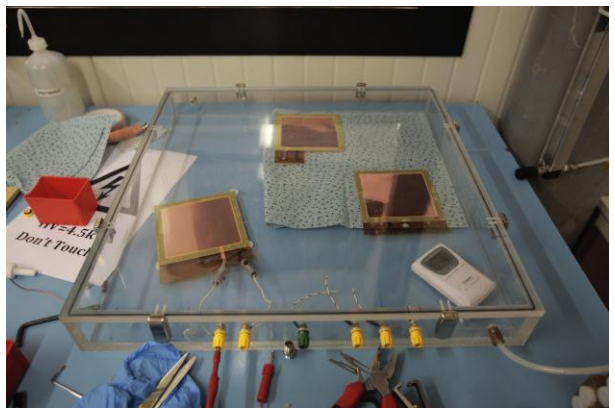
- New Flex in Korea has produced GEM samples for RD51 before.
- There had been communication breakdown between RD51 and New Flex
- New Flex's upper management wants to pull out of GEM foil business.
- An R&D team leader at New Flex created a company called Uplus Lab in the hope to take over the GEM foil business from New Flex.
- Need to check closely if Uplus Lab is capable of building resources (manpower, expertise, and production facilities) that meet our requirements.
- MoU is being drafted for the official participation of Korea in GEM production as well as securing funding for 5 years. MoU is scheduled to be signed at the upcoming CKC (CERN-Korea Committee) to be held on Oct 29, 2012.

# Readiness of the current measurement facility in Korea

- **Aim:** Participate the upgrade project for forward muon system in CMS
- **Subject:** To test quality of **GEM foils produced at “UPlus Lab”** in Korea before shipping to CERN.
- **Method:** Measure leakage current of each GEM foil at the operational voltage.
- **Status** of GEM detector investigated by RD51 & CMS for CMS upgrade
  - GEM size: 10x10 cm<sup>2</sup>, 30x30 cm<sup>2</sup>, full-size GE1/1 (GE: Gem Endcap)
  - GE1/1-1 to GE1/1-3 are tested and 4<sup>th</sup> one has been fabricated.  
(position uniformity and X-ray source test by RD51, aging test at GIF)

# Setup of testing room at CERN

Acryl box for small GEM



# Readiness of the current measurement facility in Korea

- Preparation of GEM test system & detector lab by Korea CMS (KCMS)
  - Test system and detector lab will be constructed to measure leakage current of GEM foils under voltage (up to 500 V).
  - GEM prototype detector (10x10 cm<sup>2</sup>) would be assembled by M. Choi from Oct. to Nov. in 2012.

## Clean ROOM in Korea

(The site is not prepared yet and KCMS budget for next year will be spent on clean room construction.)

## Purchased Items for quality test system for GEM foil

- ① Dry keeper (W 24.5 in, H 13.75 in, D 15.5 in) to keep GEM foils clean and safe.
- ② Oscilloscope (Ch: 4ch, BW: 1GHz, 10 GSa/s)
- ③ NIM bin, HV power supply, Discriminator, and counter& timer
- ④ KEITHLEY 2001 multimeter (current measurement)
- ⑤ NI "GPIB-usb-HS"
- ⑥ Gas system (Ar/CO<sub>2</sub>/CF<sub>4</sub> = 45:15:40) (It will be installed next year due to research fund.)
- ⑦ DAQ pc (windows+LabView)
- ⑧ Nitrogen gas (pressure valve + ball pin flow meter)
- ⑨ Acrylic box (1 x 1 m<sup>2</sup>, o-ring & lock)
- ⑩ Temp. & Humidity (digital) meter
- 11 Multimeter (digital)
- 12 Air&dust detector
- 13 Door closing for clean status in the room

# GEM Simulation Work

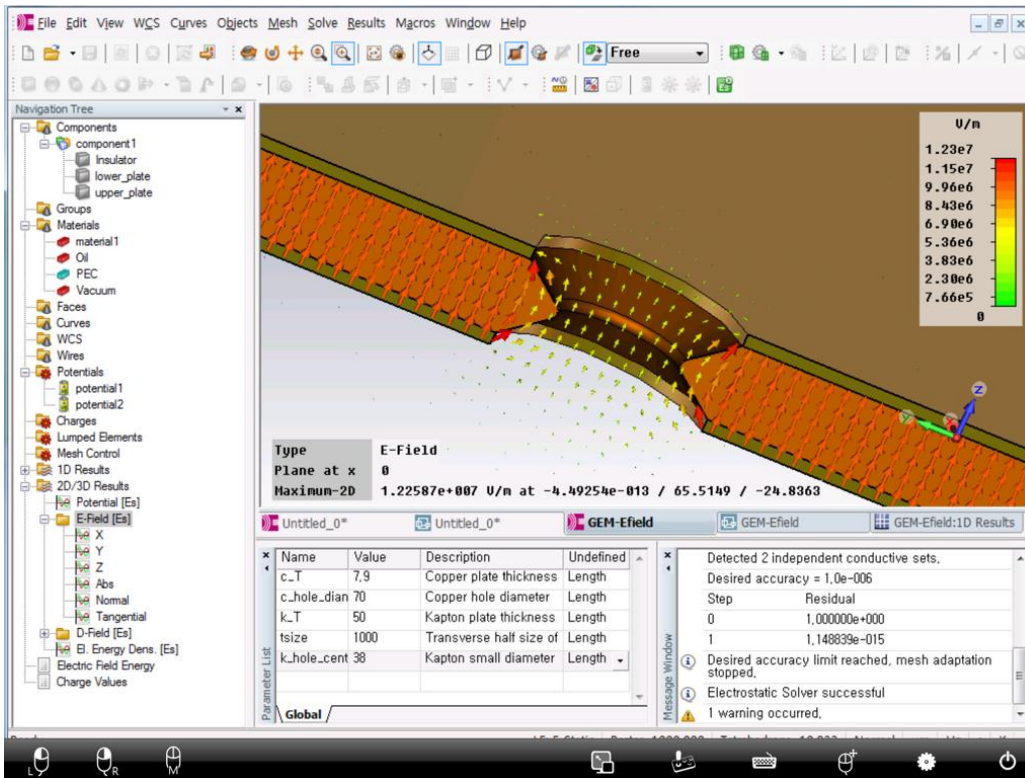
- In progress
  - Calculation of E-field of single hole GEM using CST studio
- Will calculate E-field parameters for 10x10 cm<sup>2</sup> GEM foil
- Need time to familiarise with GEANT4

# Summary

- There has been some hiccups in the GEM production plans in Korea but settled down.
- Korea's GEM detector involvement will be made official soon.
- Preparation for GEM testing facility has started.
- MC work is also started.

# Calculating E-Field

Screen shot of CST studio calculating E-field for a single GEM hole.



Need to refine boundary conditions and calculate for many holes.