Medium size (30 cm × 30 cm) Double Thin gap GEM-μRWELL prototype

HV test results of the μRWELL layers

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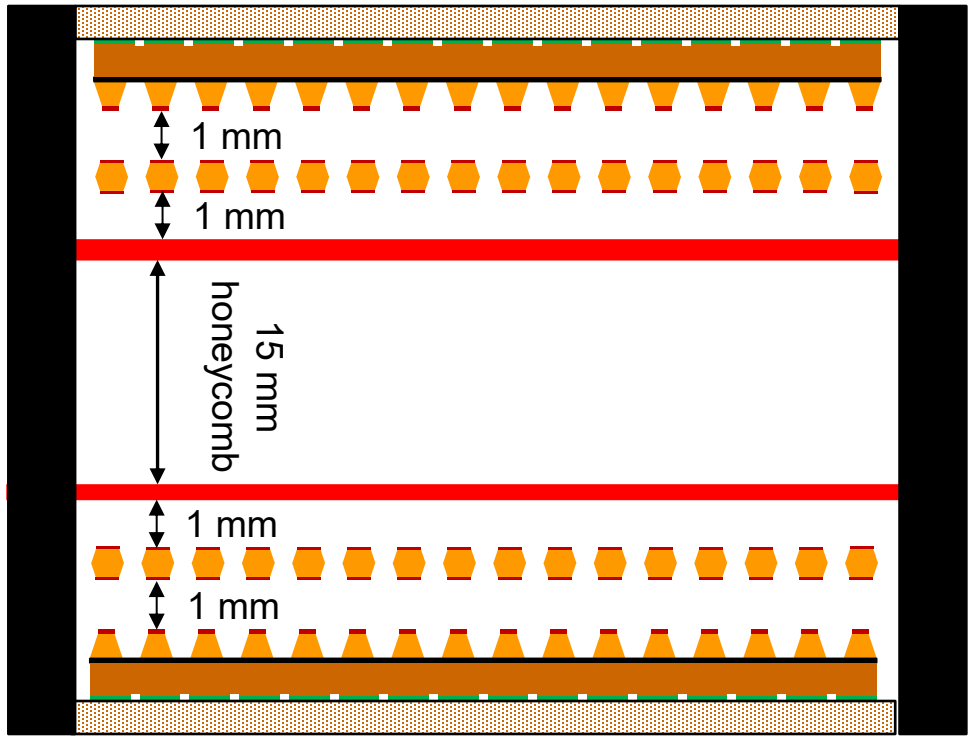
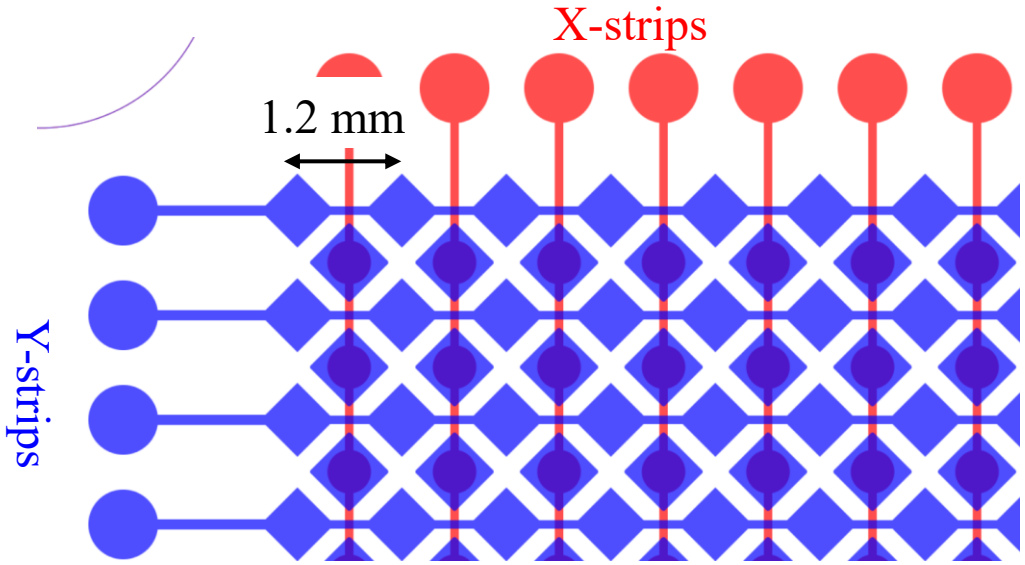
EIC Generic R&D bi-weekly Meeting - February 12, 2026

Medium size (30 cm × 30 cm) double thin-gap GEM-µRWELL hybrid prototype



- Development of low channel count, double-sided thin-gap 30 cm x 30 cm active area **GEM- µRWELL hybrid detectors** with capacitive-sharing readout board.
- 1.2 mm pitch X-Y strip with **ASACUSA** pattern & 3 capacitive sharing layer
- **Applications:** Muon trackers, outer layers of an EIC central tracker

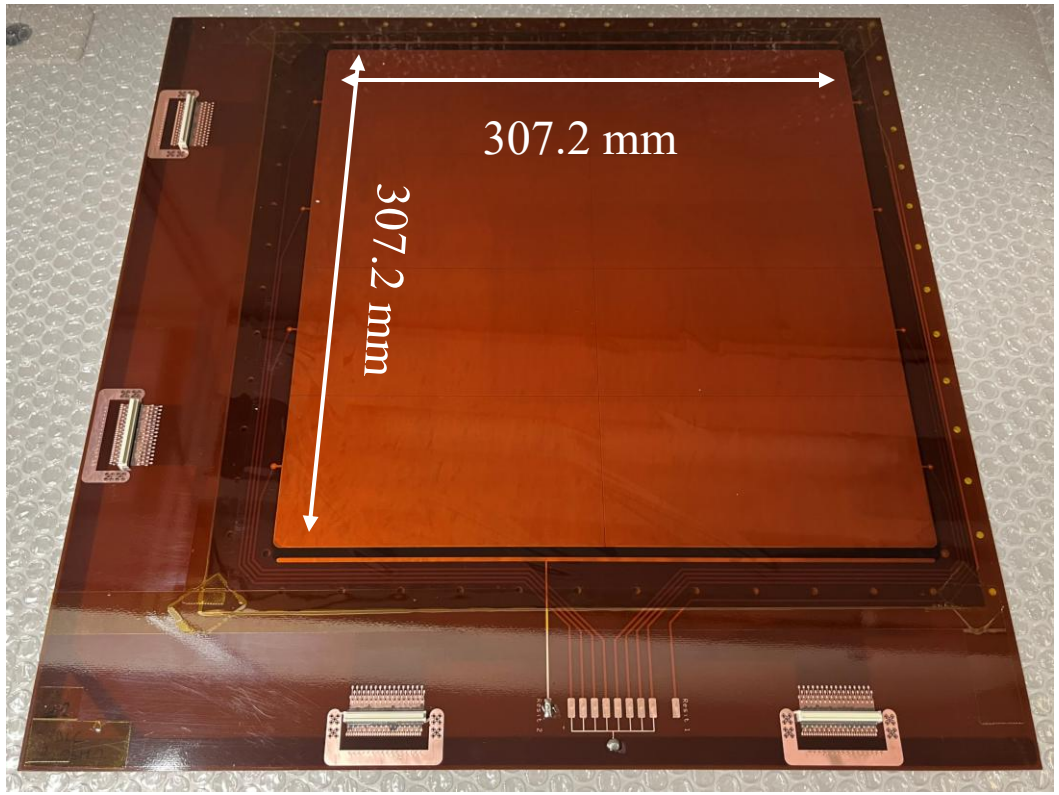


X-Y strips ASACUSA pattern

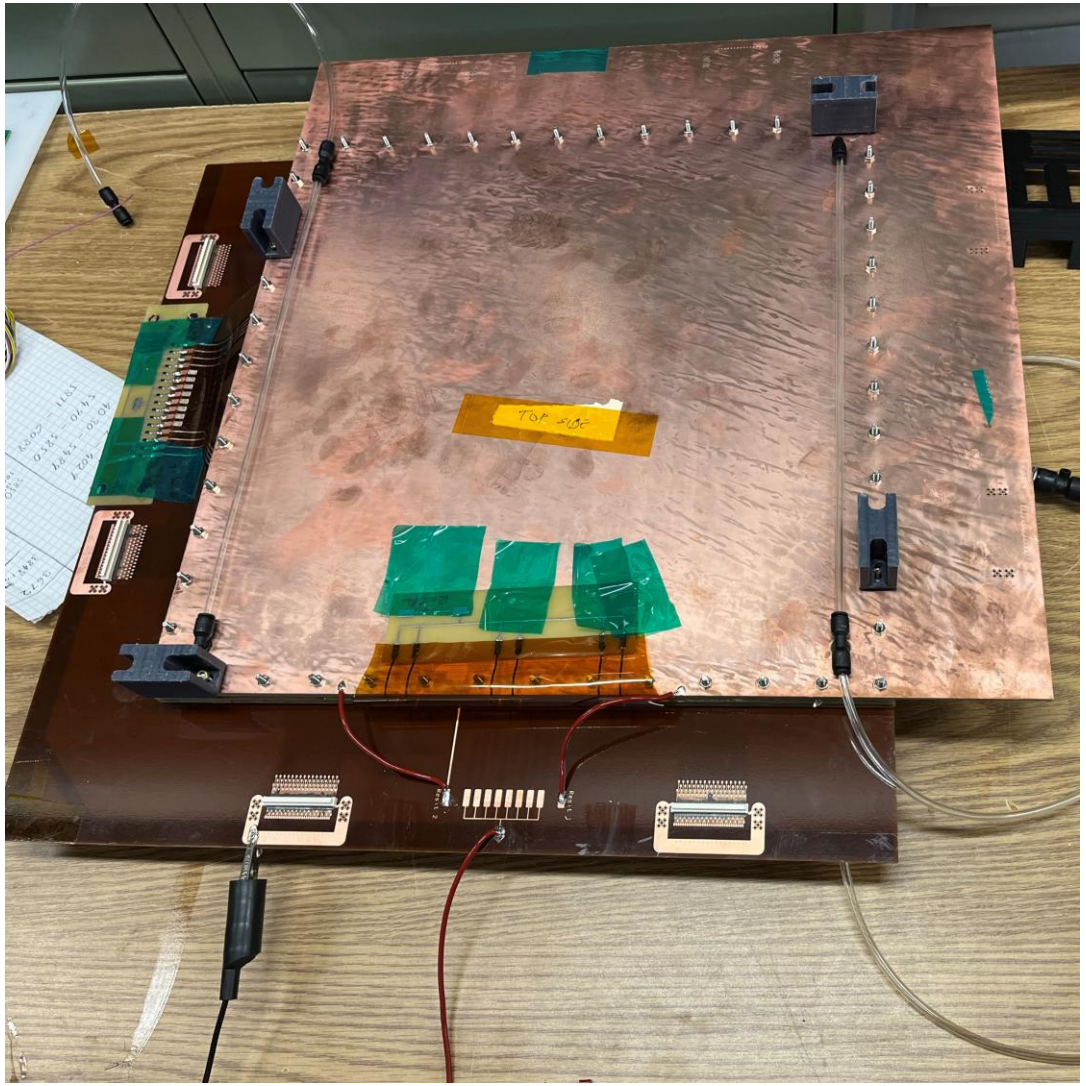
- Design of the GEM, cathode & mechanical done @ UVa
- Design of the µRWELL PCB + capaSh readout @ JLab
- Assembly of prototype @ UVa (2025)
- HV tests @ UVa (2025 / 2026)
- Plan tests in beam at JLab and at CERN

https://www.jlab.org/sites/default/files/eic_rd_prgm/files/2023_Proposals/20230714_eRD_tgMPGD_Proposal_FY23_Final_EICGENRandD2023_16.pdf

Double thin-gap GEM-µRWELL hybrid prototype



One of the two µRWELL PCBs



Double thin gap prototype under test @ UVa

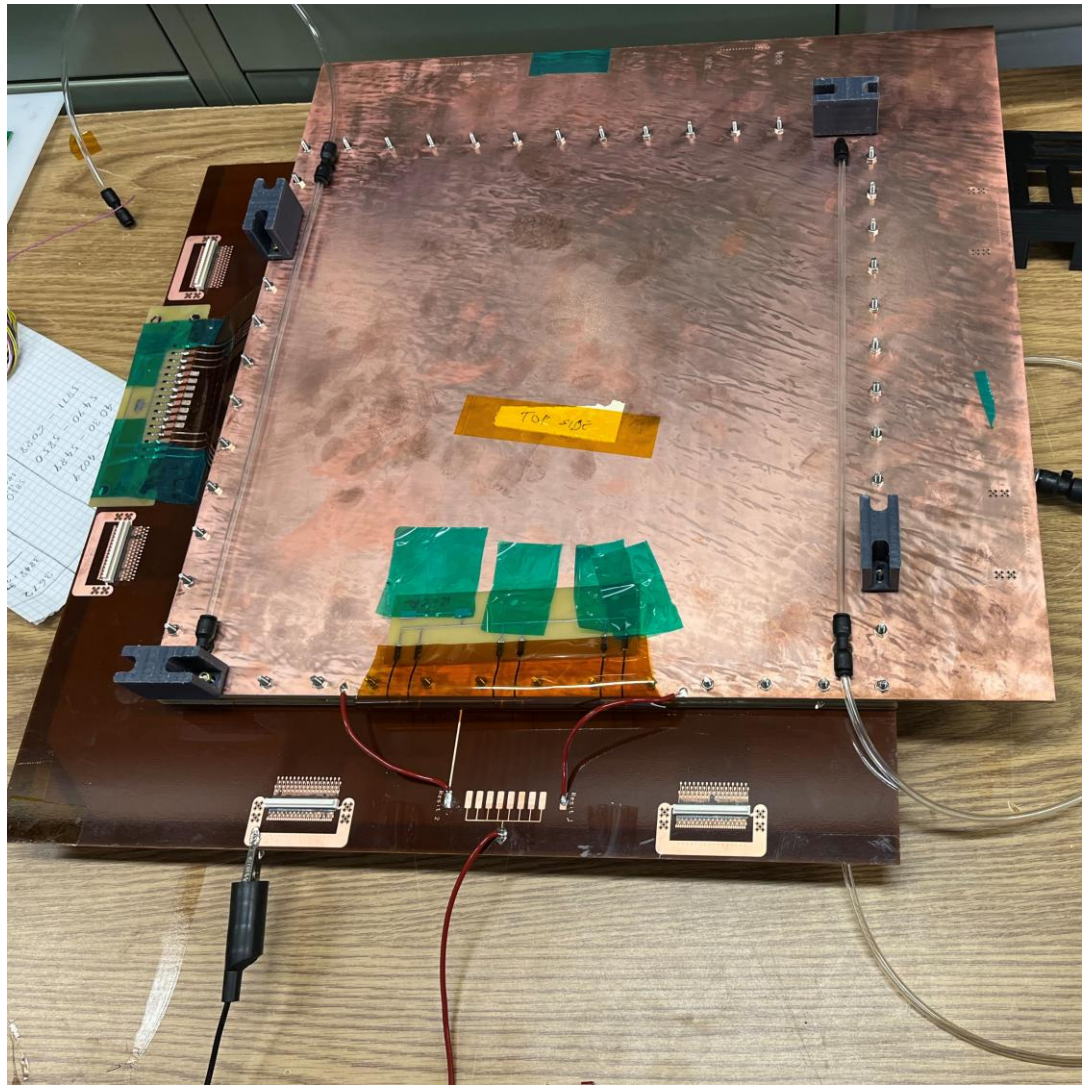
HV test of the two µRWELL @ UVa (January 28-29, 2026)

HV test procedure:

- All 8 sectors of each µRWELL connected together
- Ramp up the voltage from 0 to 600 V by step of 10 or 20 V
- Test is done for min 2 min for each voltage settings
- Monitor the µRWELL leakage current with picoammeter. The current is recorded on computer via a LabView program
- Top side was tested on Thursday 28th
- Bottom side on Friday 29th

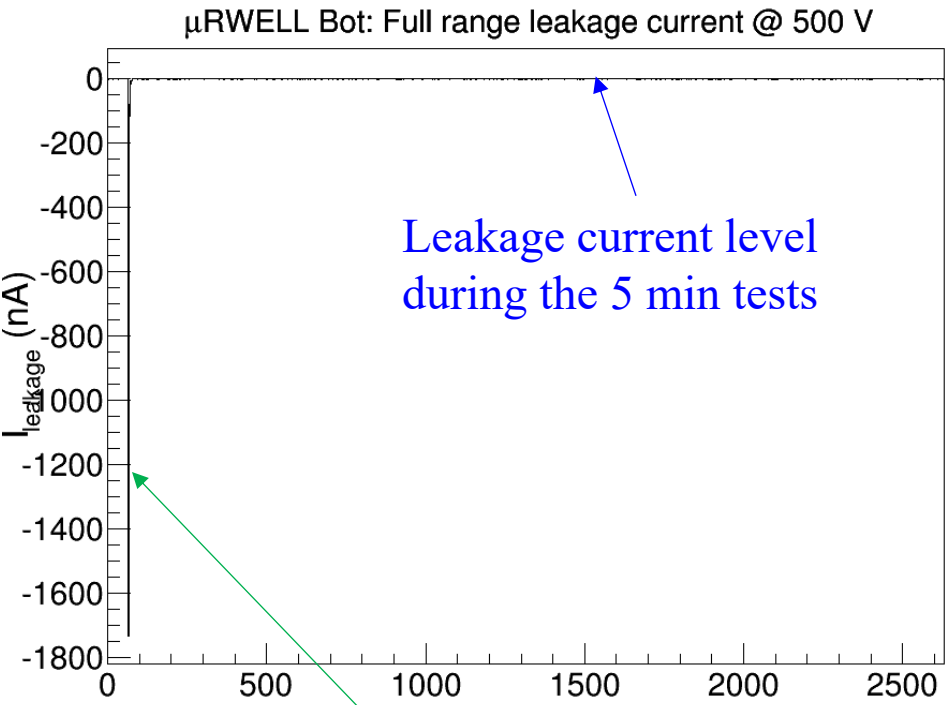
Test results:

- No leakage current was observed for all two sides from 0 to 600V
- Only µRWELL BOT had one spark at 600V resulting on current spike that quickly (or slowly) goes down to 0
- LOOKS like the prototype is in pretty good shape

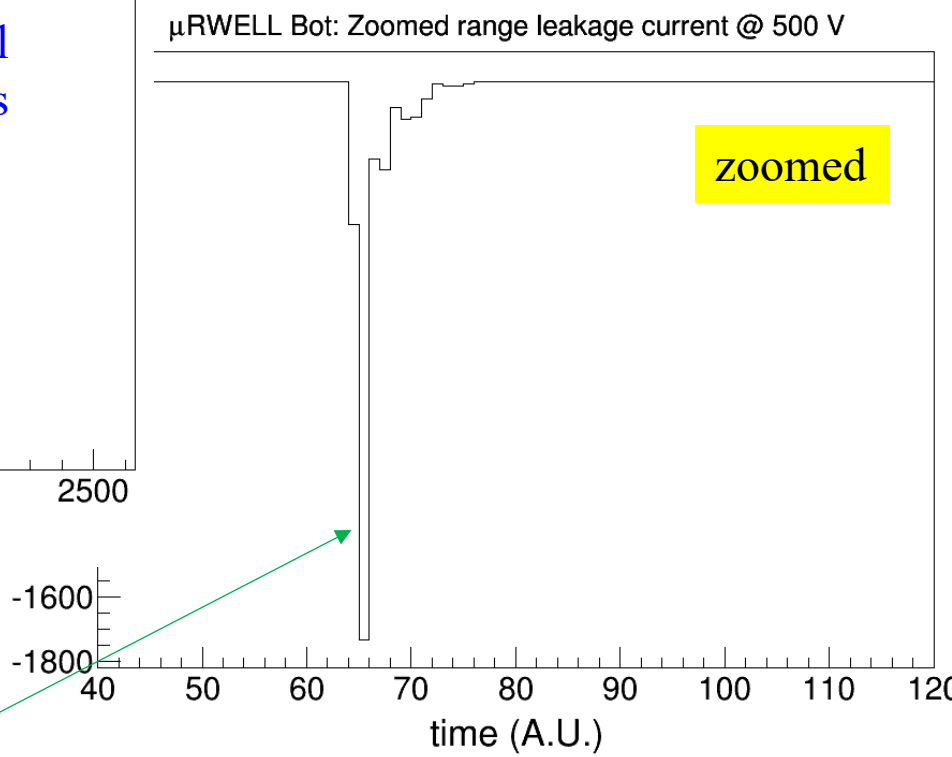


Double thin gap prototype under test @ UVa

Typical HV test results

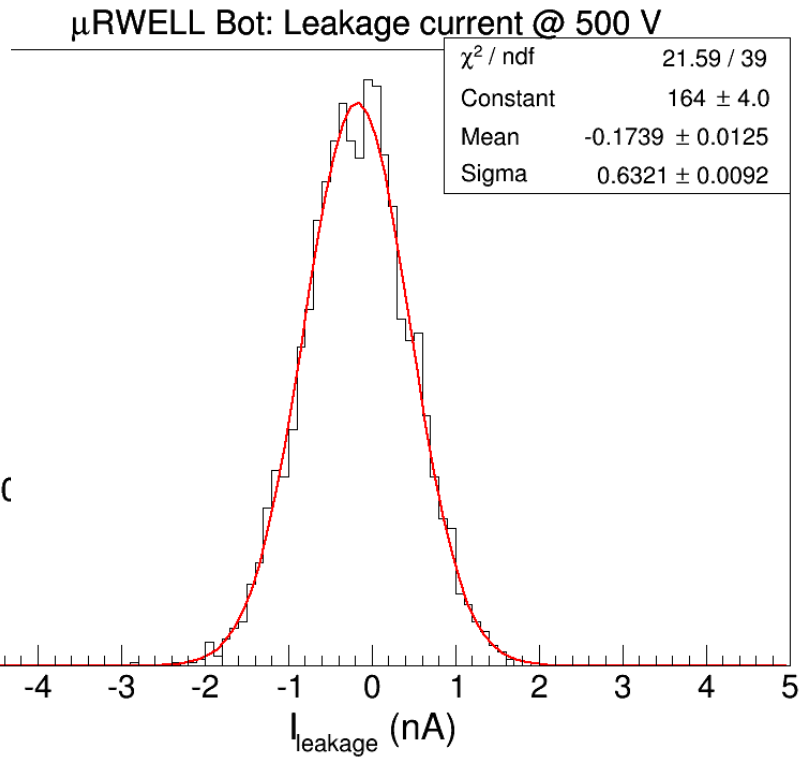


Leakage current level during the 5 min tests



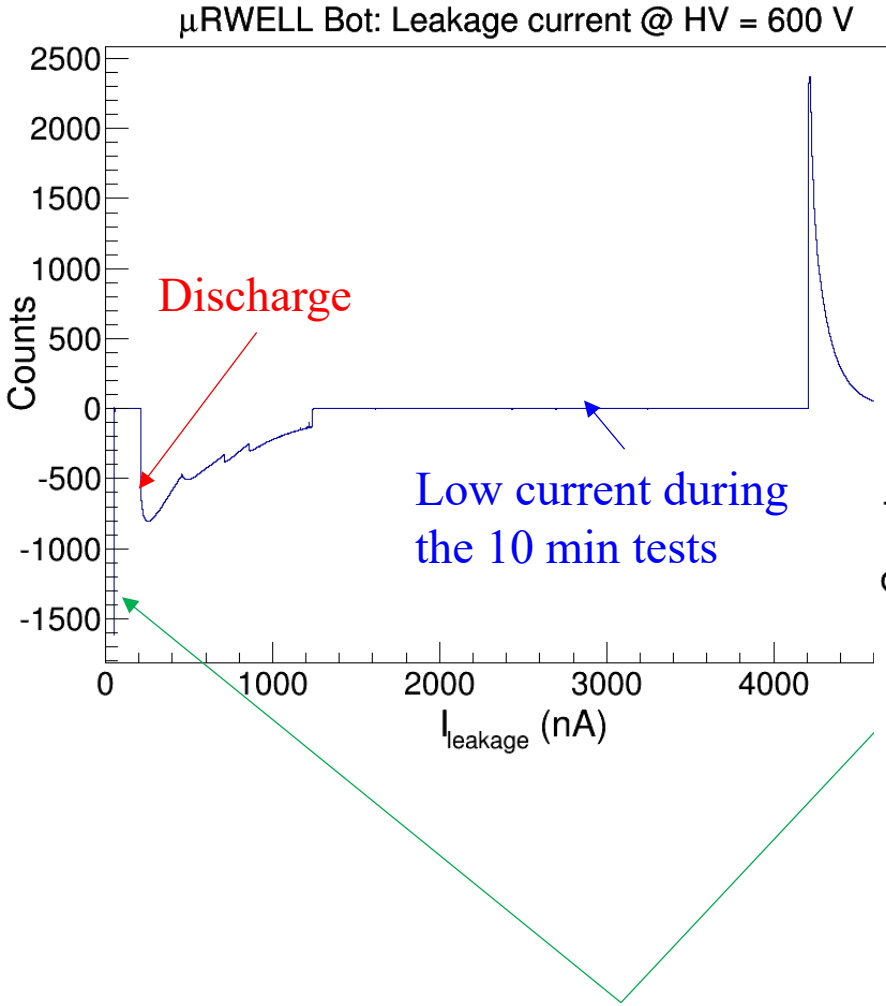
zoomed

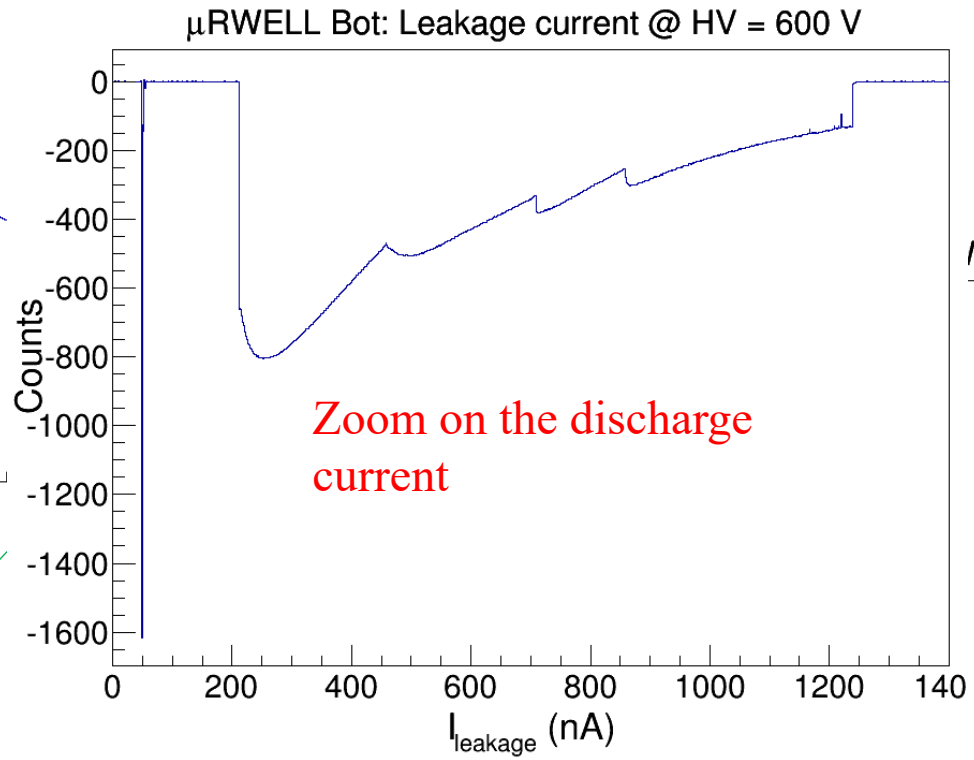
Current fluctuation distribution

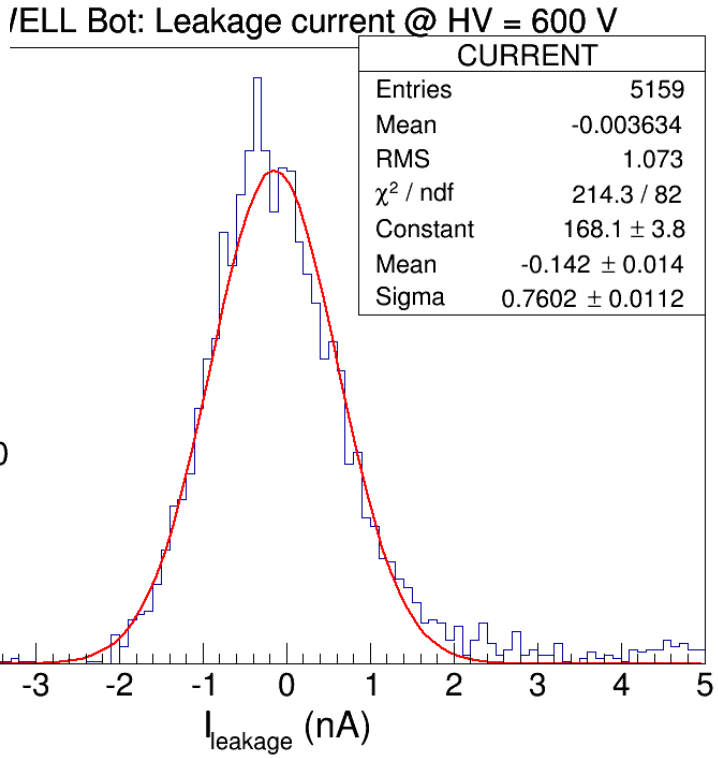


Current at the beginning after HV is applied
➔ charging with detector capacitance

µRWELL BOT @ 600 V







Current at the beginning after HV is applied
➔ charging with detector capacitance

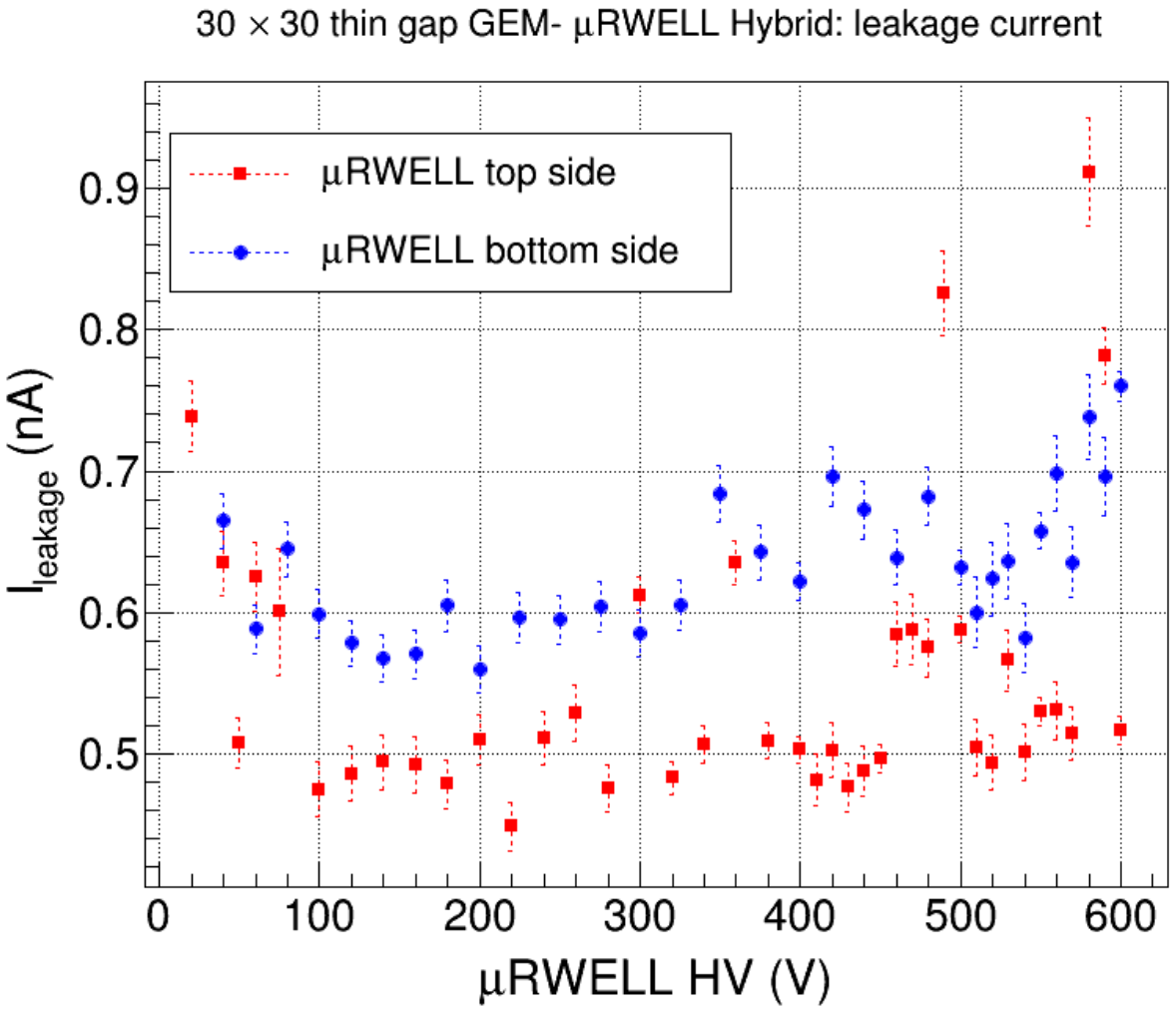
Width of the current fluctuation for µRWELL TOP and BOT

µRWELL HV test results:

- No leakage current was observed for all two sides from 0 to 600V
- Average current is around 0 ➔ basically no current in the chamber
- Current fluctuates between 0.5 nA and 1 nA at all HV settings
- Only µRWELL BOT had one spark at 600V resulting in a current spike that quickly (or slowly) goes down to 0
- LOOKS like the prototype is in very good shape

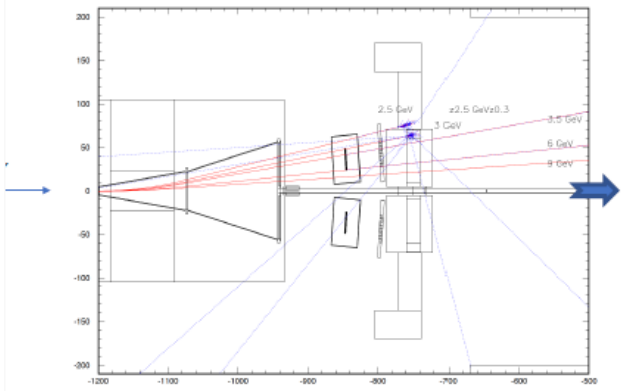
What's next

- HV tests need to be repeated for both GEMs & µRWELLs
- Take data with cosmic at UVa
- Perform gas studies at in beam test @ JLab (April / May 2026)
- Perform spatial resolution and B field test at CERN (July / August 2026



Opportunity for beam test in the Hall D in April

EIC prototypes beam-tests in Hall-D 2026 (new)



Start March 30 - End Aug 30

Switch Low to high ???

Feb 11, 2026.

Week	date	Energy	Left arm (tracking)	Right arm (CAL)
W1	March 30	Low	BIC	HAll-D HiCAL
W2	April 8	Low	BIC	HAll-D HiCAL
W3	April 15	Low	BIC	HAll-D HiCAL
W4	April 22	Low	MPGD	HAll-D HiCAL
W5	April 29	Low	MPGD	HAll-D HiCAL
W6	May 6	Low	MPGD	MOLLER
W7	May13	Low	TRD/ FPGA	MOLLER
W8	May 20	Low	Short week / SWITCH TO HIGH ENERGY	MOLLER
W9	May 27	Low	SWITCH TO HIGH ENERGY	SWITCH TO HIGH ENERGY
W10	June 3	Low	Short week/ SWITCH TO HIGH ENERGY	SWITCH TO HIGH ENERGY
W11	June 10	High	HALL-D TRD	HALL-D TAG-M
W12	June 17	High	HALL-D TRD	HALL-D TAG-M
W13	June 24	High	HALL-D TRD	HALL-D TAG-M
W14	July 1	High	SVT	CRYTOR
W15	July 8	High	SVT	CRYTOR
W16	July 15	High	SVT	CRYTOR
W17	July 22	High	LUMI	HAll-D HiCAL
W18	July 29	High	LUMI	EEECAL
W19	Aug 5	High	BIC	EEECAL
W20	Aug 12	High	BIC	EEECAL
W21	Aug 19	High	MPGD	EEECAL
W22	Aug 26-Aug 30	High	MPGD	

Jefferson Lab