

Resistive Electrode GEM (RETGEM)

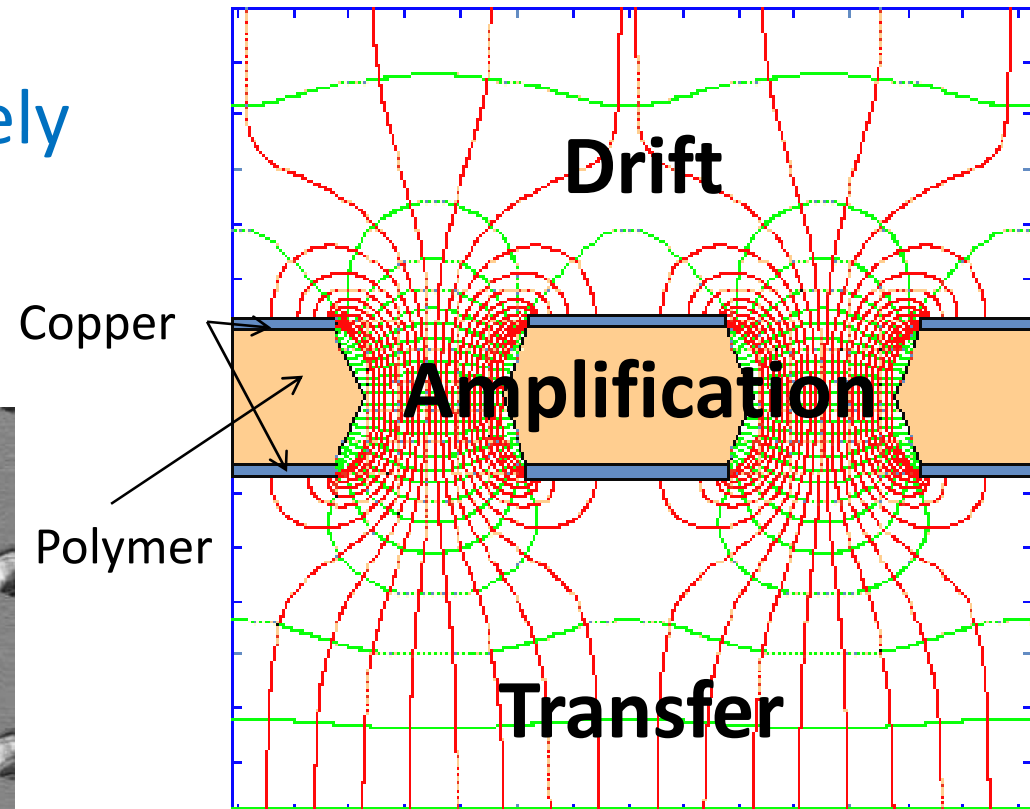
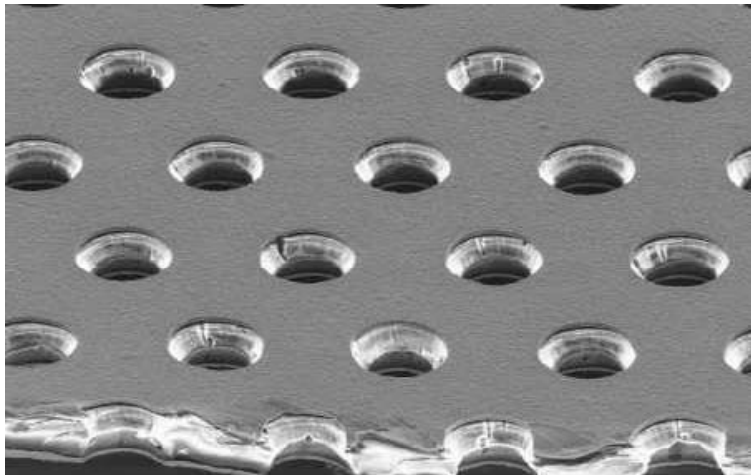
Brian Clark

North Carolina State University, USA

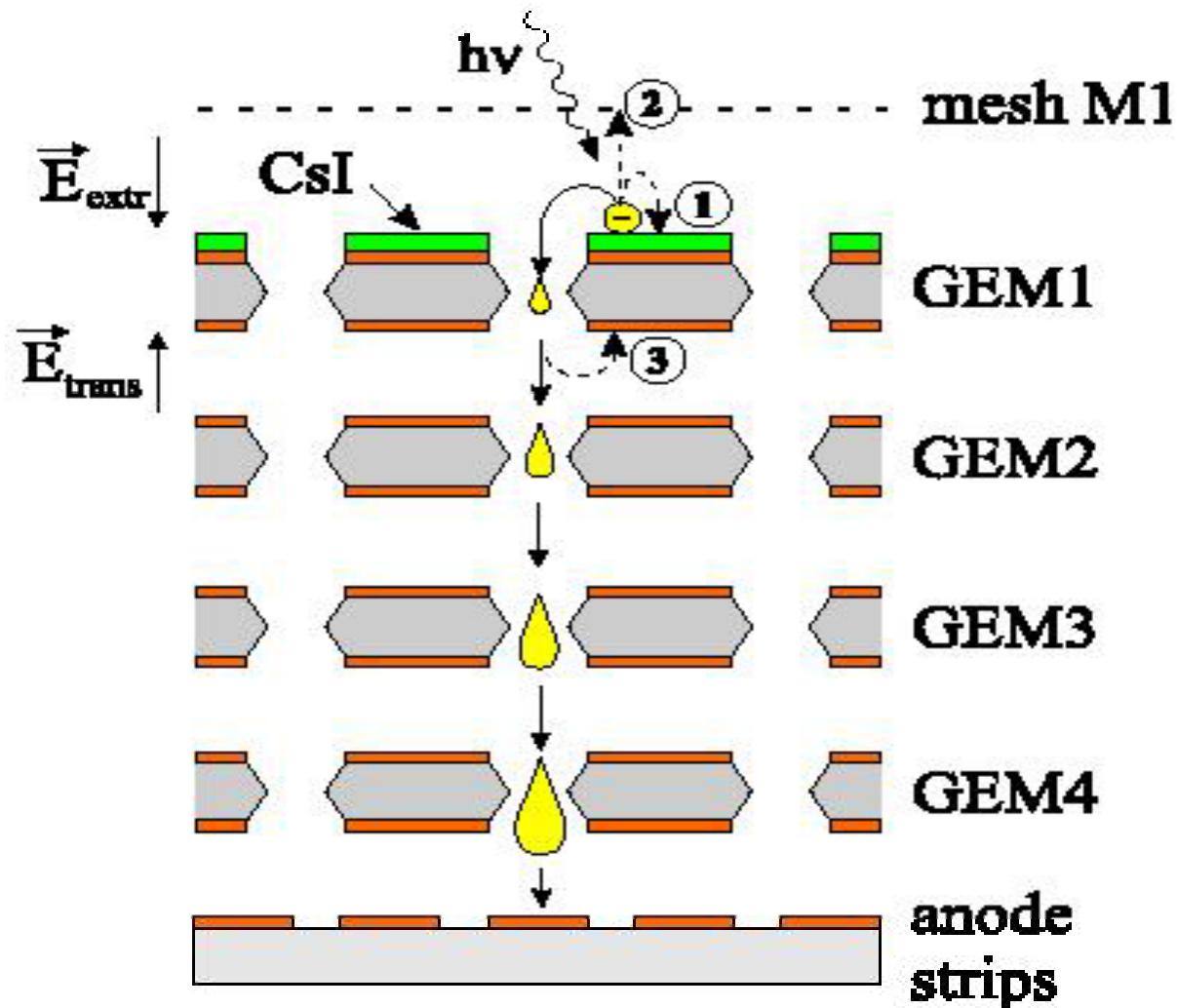
Work conducted under the supervision of Professor Vladimir Peskov (CERN).

What is a GEM?

Thin metal-insulator-metal structure densely perforated with small holes.



Multi-Step GEM Setups



Benefits

- Geometric quenching suppresses feedback.
- Great for noble gaseous detectors.
- Manufactured by microelectronic technology which offers high granularity.
- Relatively cheap to produce in comparison to solid state detectors.
- Cost-effectiveness makes GEM ideal for experiments requiring a large detection area.

Applications



ICARUS

XENON

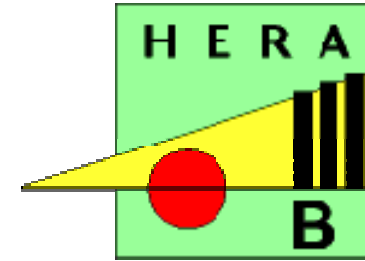
LHCb

COMPASS

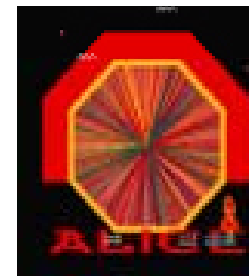
HERA-B

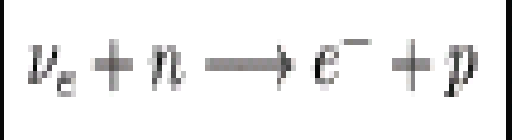
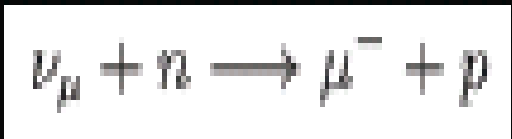
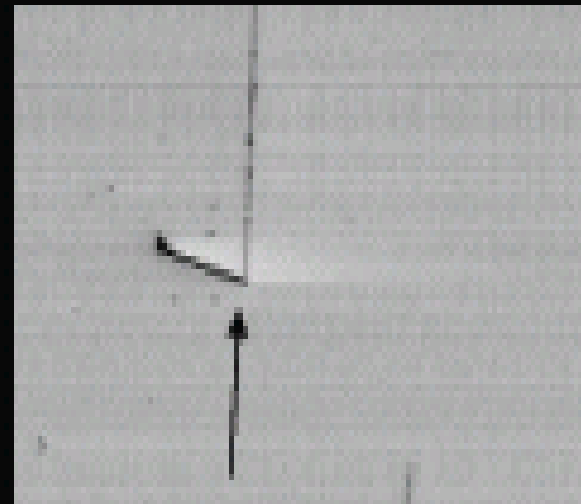
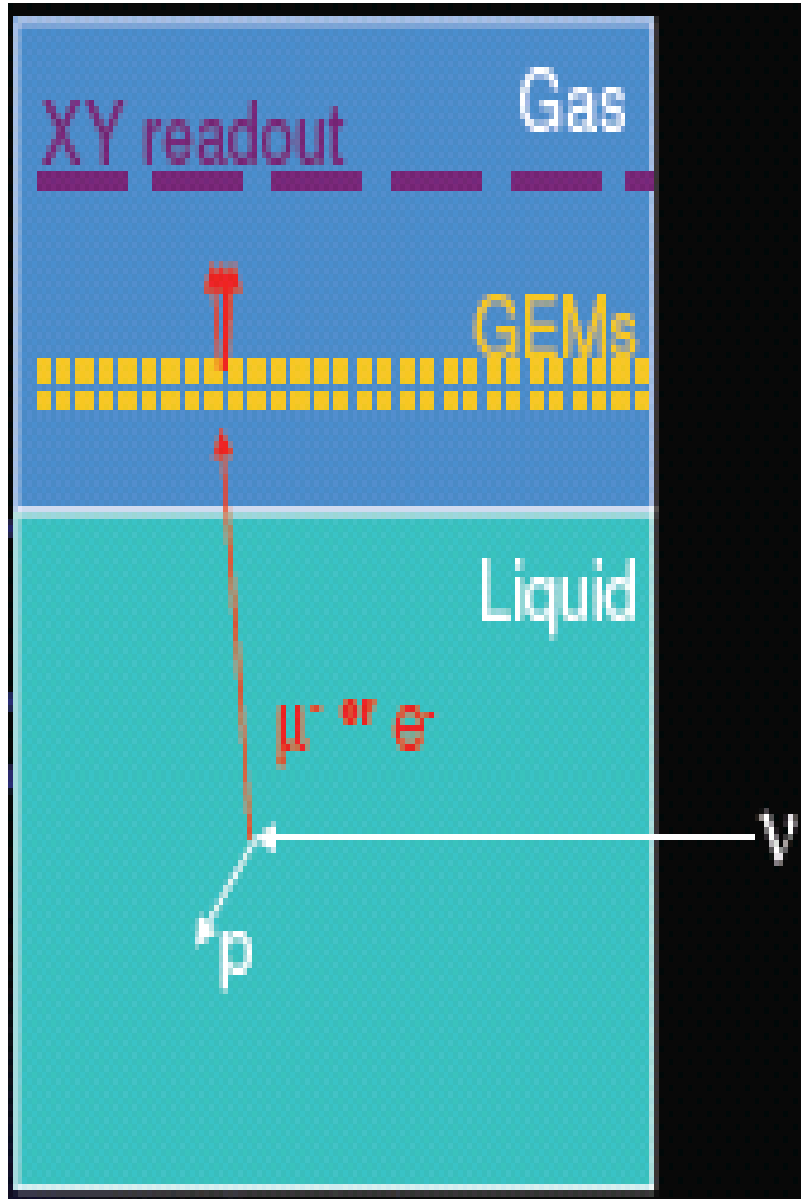
TOTEM

ALICE

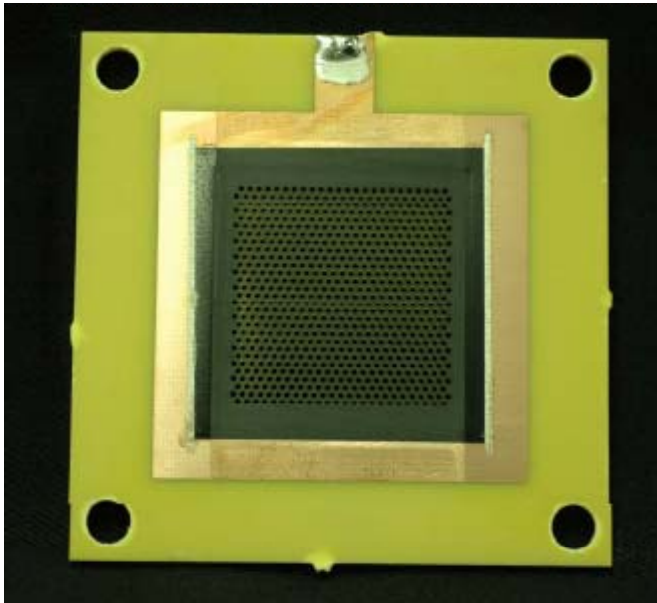


TOTEM





Resistive Coating (RETGEM)



Spark resistant!

- Traditionally coated with Kapton*
- First tests of RETGEMs manufactured by screen-printing technology**

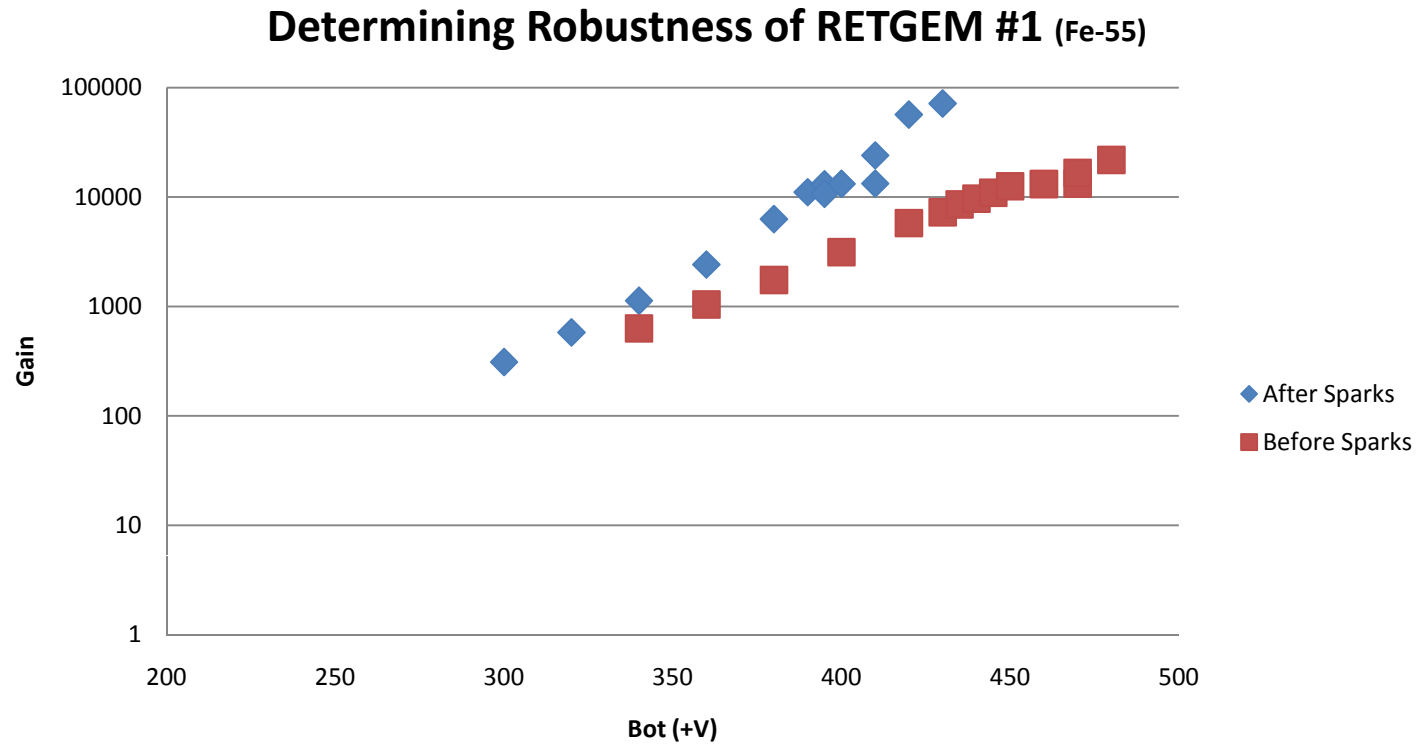
*V. Peskov CERN Courier, May , 2007

**Developed by R. Oliviera CERN/PMT/Workshop

Benefits of Screen-Printed RETGEMs

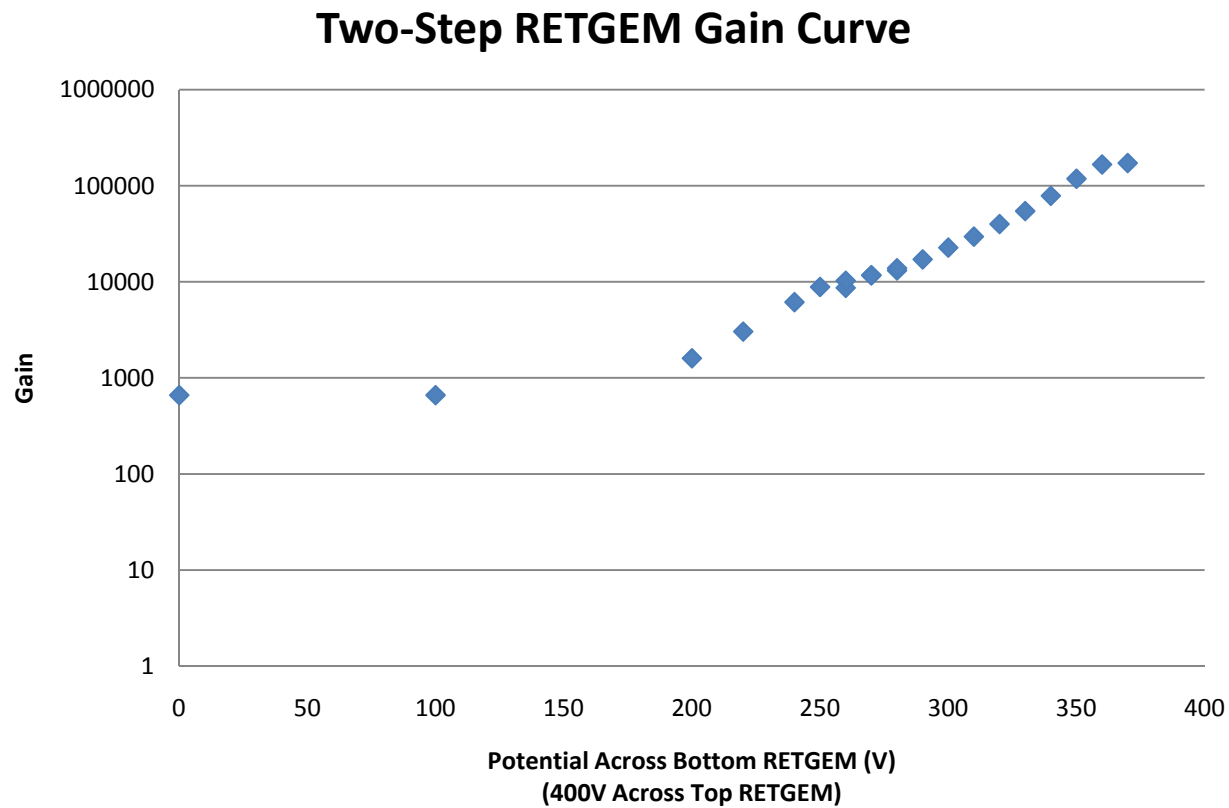
- Ability to easily tune the resistivity
- Low cost manufacturing
- Widely available technology

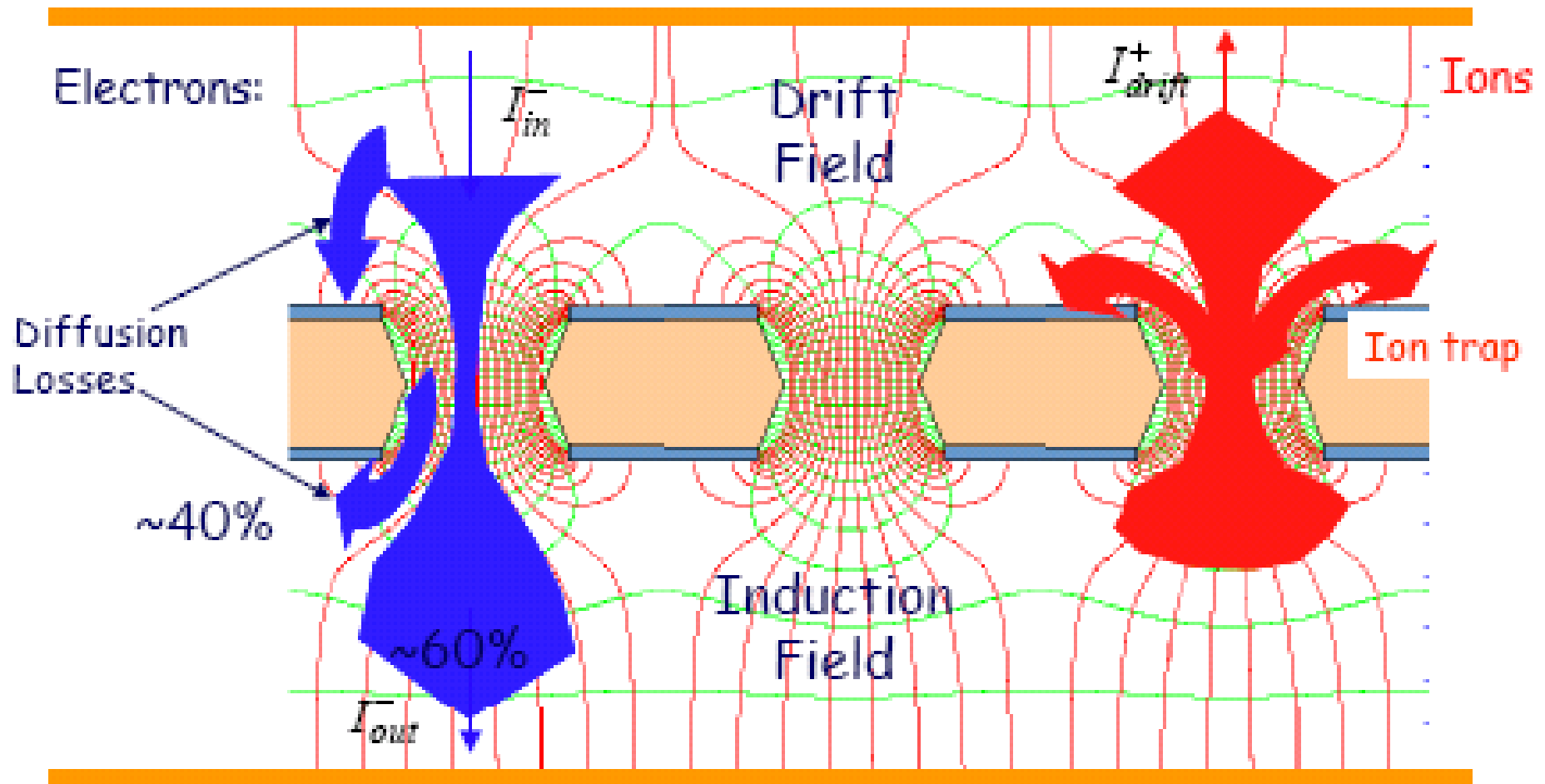
Spark Protected



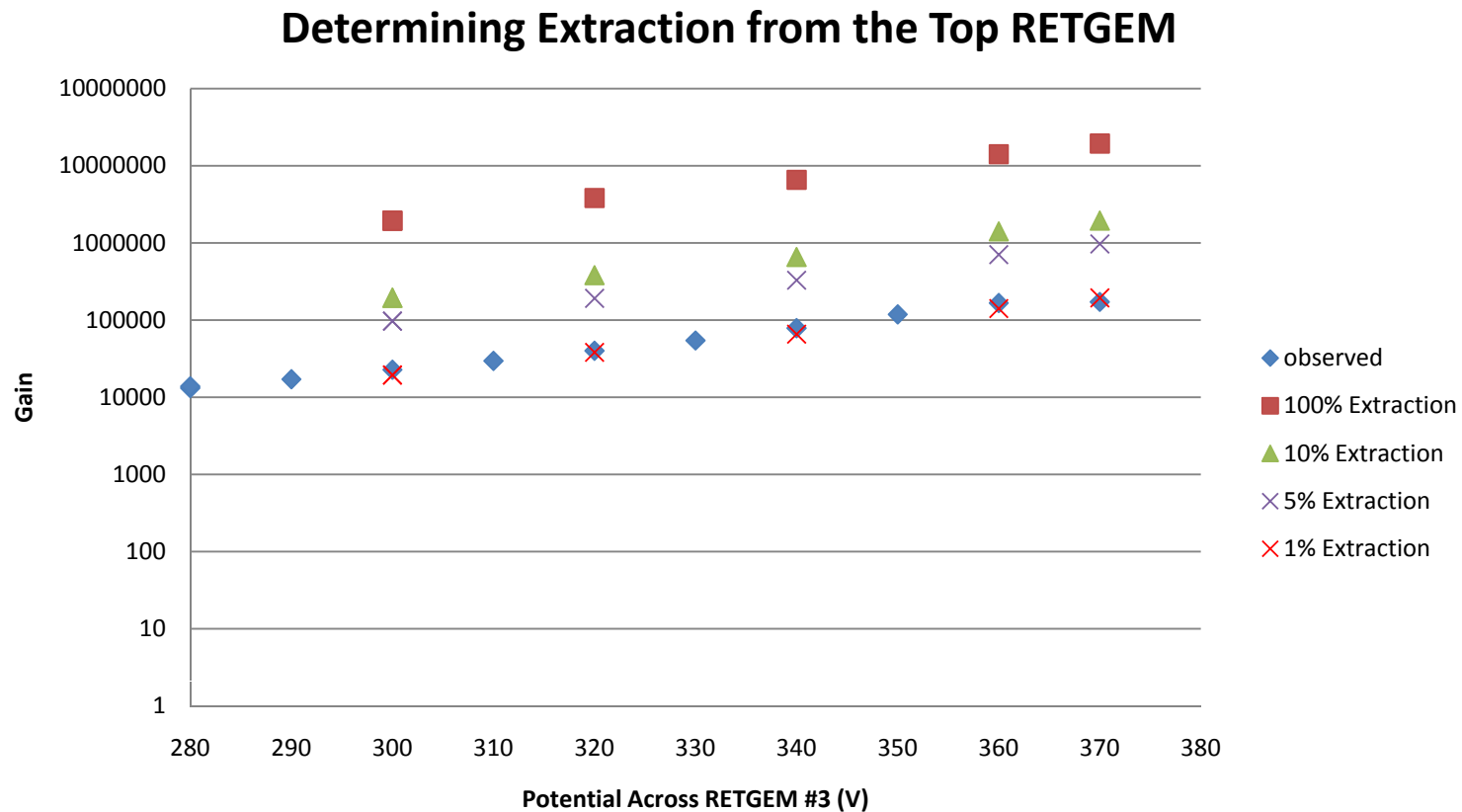
Gain of approx. 10^5

Gain of 10^5 in Ne

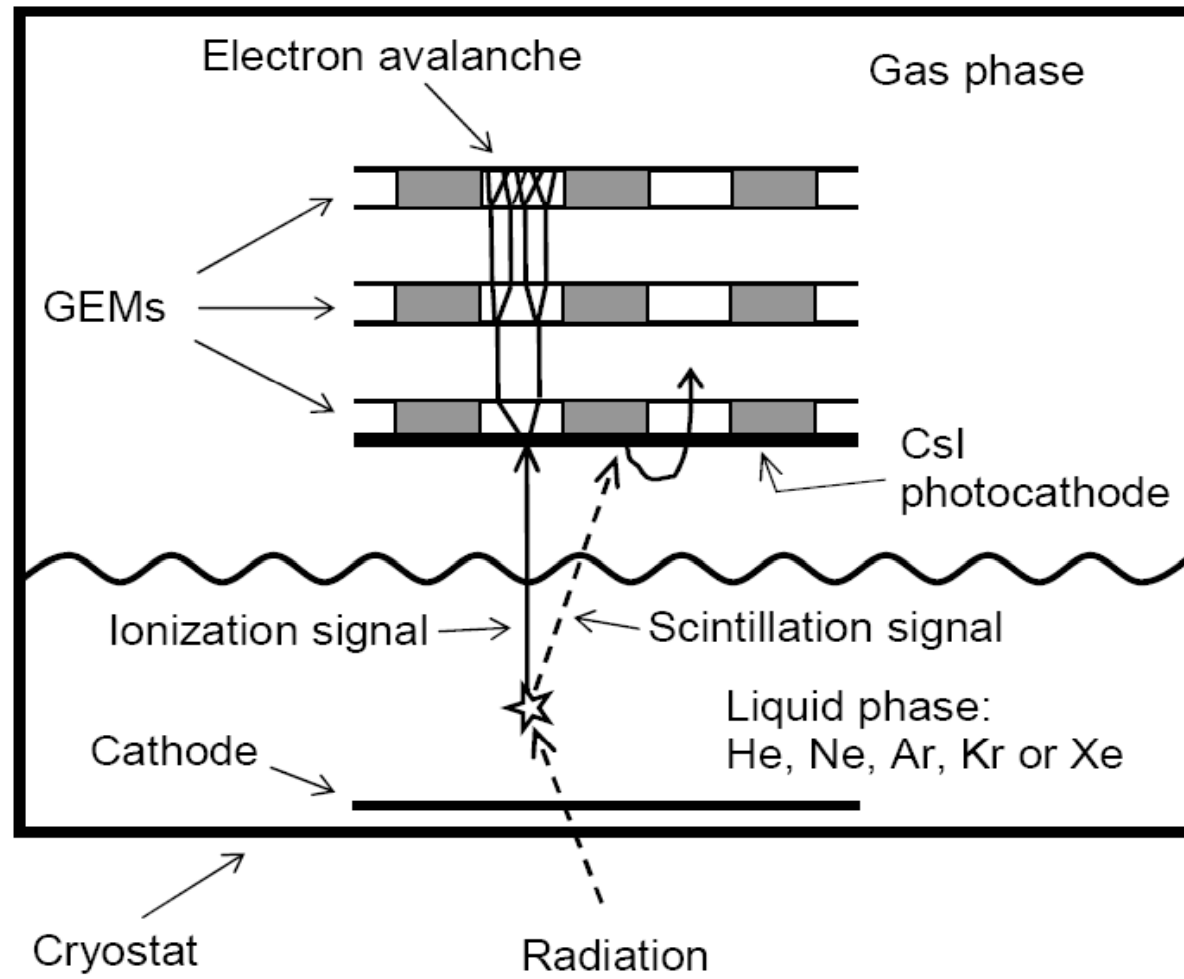




Predicted Gain of $> 10^6$

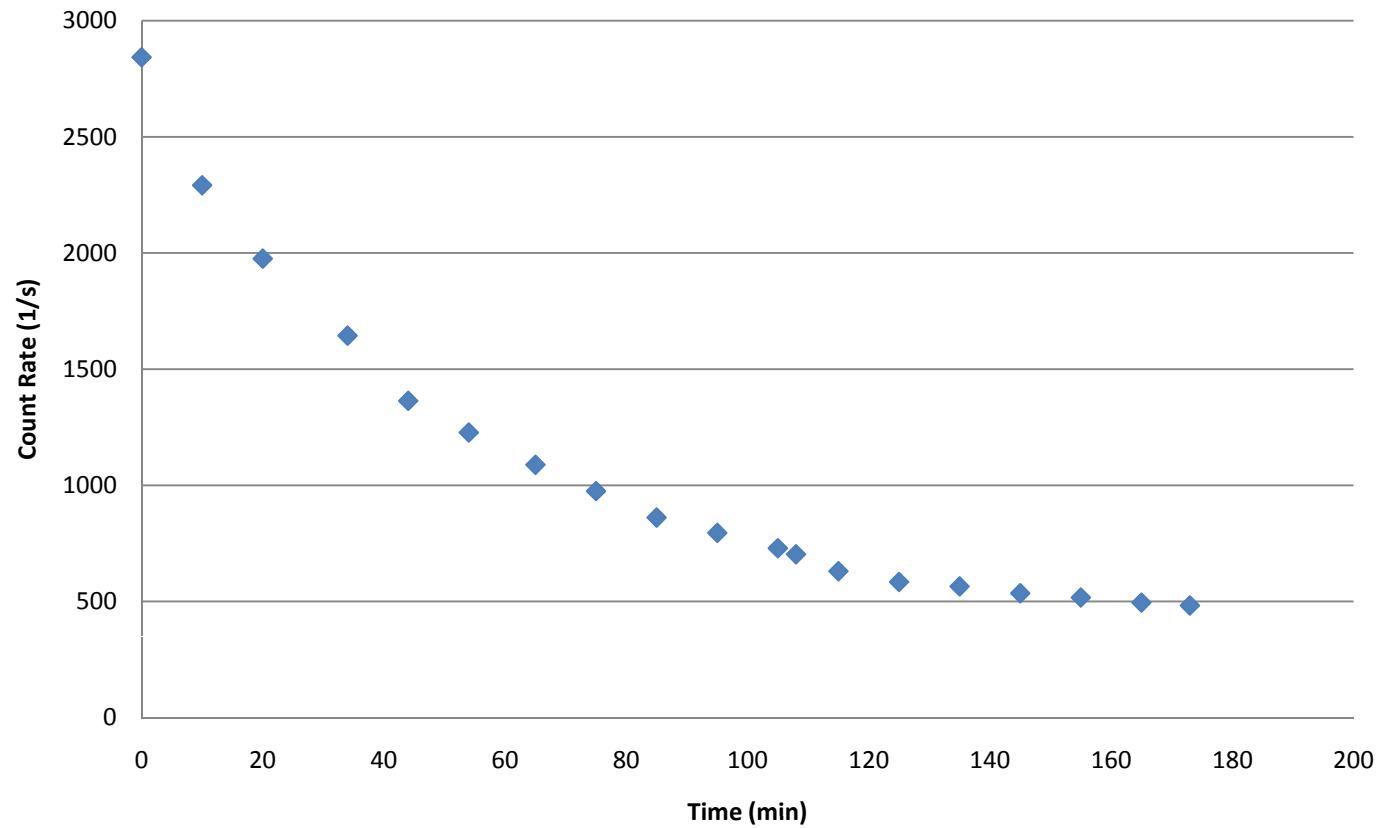


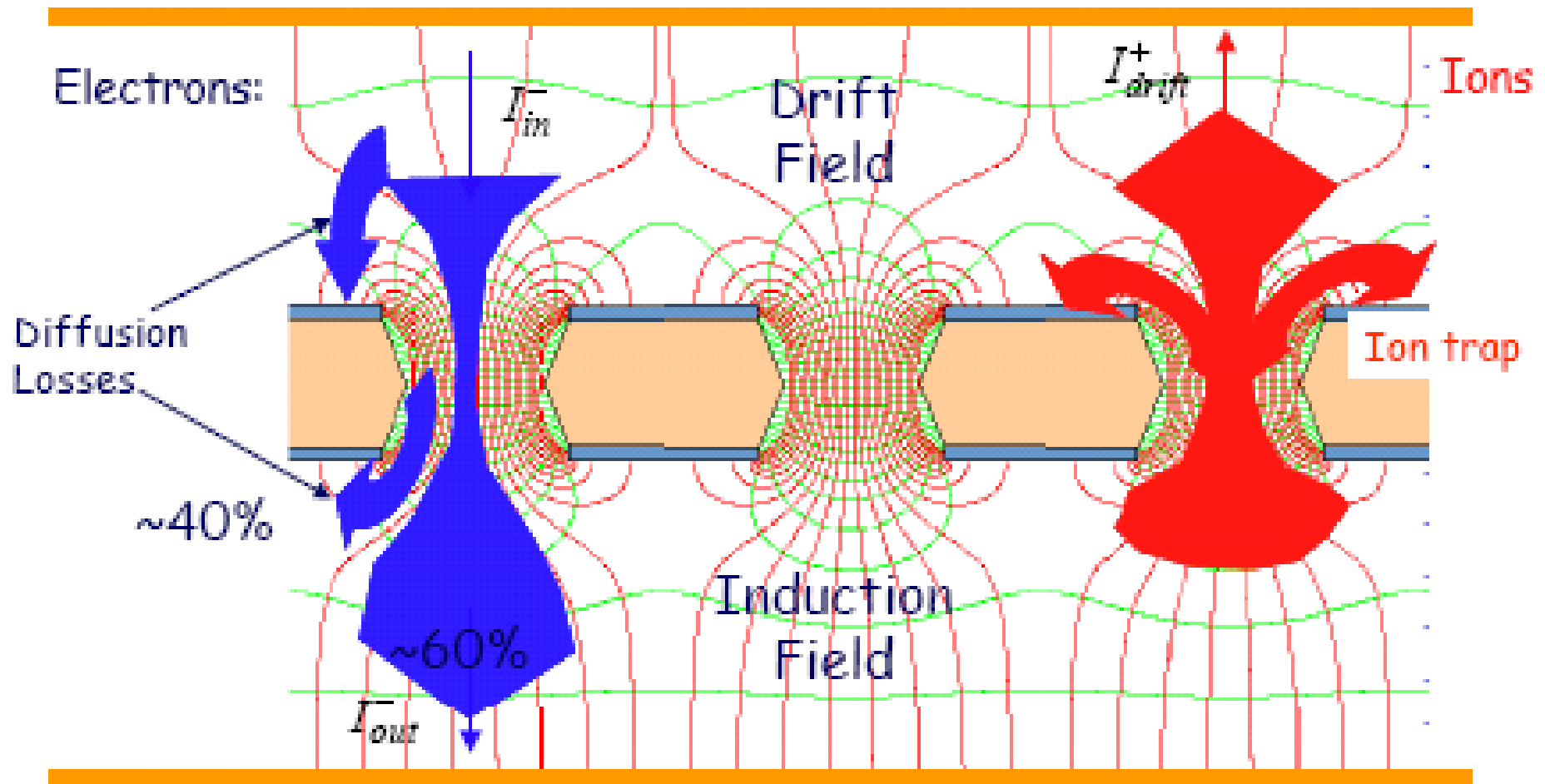
Alternative to PMTs



Stability

High Count Rate Stability

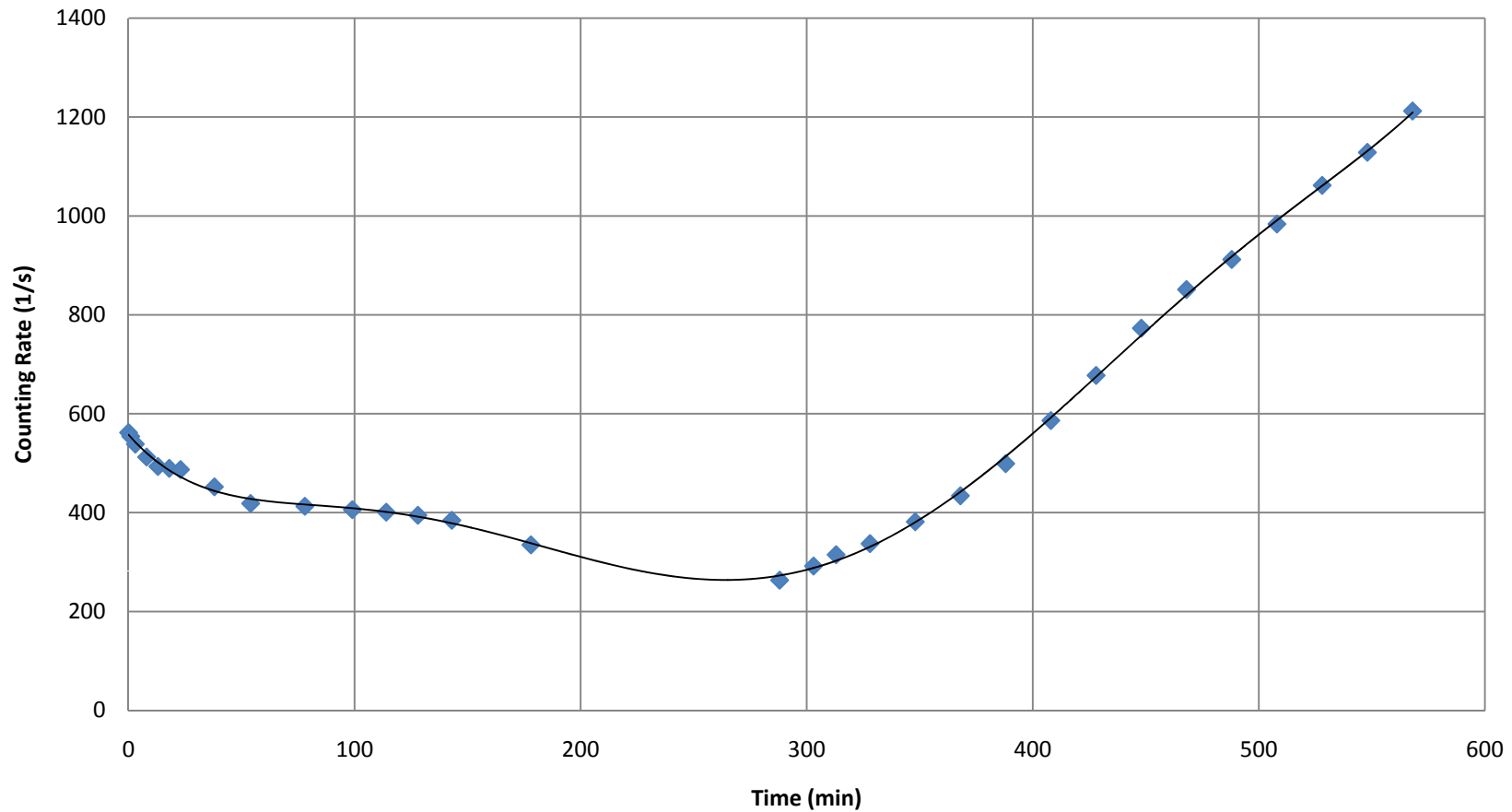




Stability

(Two-Step RETGEM with CsI)

Stability Measurement



Acknowledgements

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- University of Michigan
 - Professor Jean Krisch
 - Professor Homer Neal
 - Dr. Steven Goldfarb
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