ERS-6
at Austrian Institute of Technology

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Resume

University of Ontario Institute of Technology

- Bachelor of Engineering (2007-2011)
  - Mechanical Engineering (Energy option)
- Master of Applied Science (2011-2012)
  - Nuclear Engineering (Radiation science)

Previous Work (1/2)

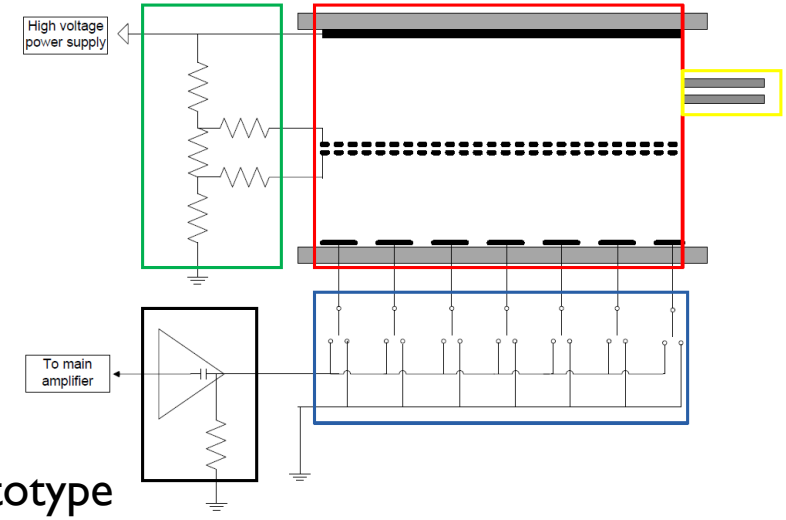
Simulation, design and construction of a gas electron multiplier for particle tracking

- Detector for the energy deposition (stopping power) measurements of an alpha particle
- Single GEM detector with a segmented collection plate
  - 10 segments, each 4.8 mm wide
- Simulation of the GEM gain under different electric field strengths (drift, GEM and induction region) by the Garfield++ toolkit

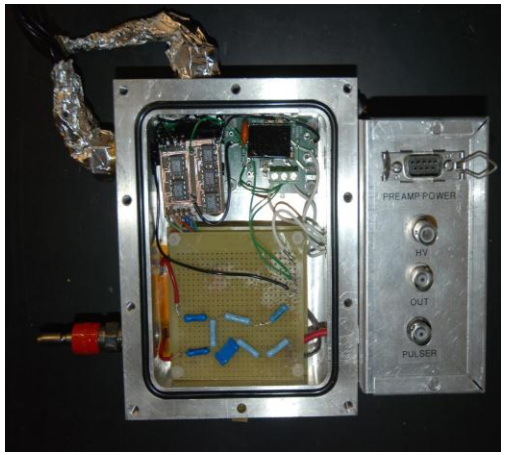
Previous Work (2/2)

The green box represents the voltage divider, red the sensitive volume, yellow the collimator, blue the collection plate switch and black the main board with pre-amplifier

Schema of the GEM detector



Detector prototype



Early Stage Researcher 6

ESR position for the evaluation of advanced detectors for in-vivo dosimetry in an animal phantom in order to provide a dose validation system for clinical treatment planning systems in radiation therapy

- AIT Vienna and Seibersdorf
- Dr. Sofia Rollet (supervisor)

Project can be divided into 3 phases

- Detector selection and animal phantom development
- Animal phantom irradiation and computer simulation
- Healthy animal irradiation and treatment simulation

Detector Selection and Animal Phantom Development

Main criteria:

- Size
- Sensitivity
- Simplicity (to avoid substantial perturbation)

Some possibilities:

- Silicon or diamond detectors (neutron)
- TLDs or OSLs (neutron and gamma)
- Miniature active detectors

Animal Phantom Irradiation and Computer Simulation

- Detectors will be placed inside the animal phantom
  - Precise location obtained by microMR and microPET
  - Undergo irradiation

- Simulation of the animal phantom with detector
  - Geometry construction based on microMR and microPET
  - Simulate the same irradiation

- Comparison and adjustment of the results will be conducted

Animal Phantom Irradiation and Computer Simulation

- Healthy animal experiment
  - Detectors will be implanted into a healthy animal
  - Undergo microPET and microMR scans to find detector location and tissue distribution for treatment planning
  - Irradiation
- Radiation therapy Monte Carlo simulation
  - Treatment simulation based on treatment planning
- Data from the treatment and the MC simulation will be compared and evaluated

Thank you

for your attention