

Work proposal

TID tests using proton beams

Assessing the radiation hardness of LGADs in high-dose limits

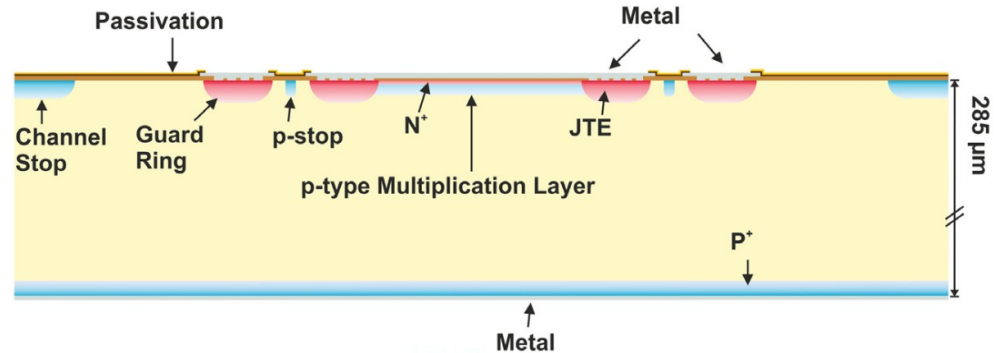
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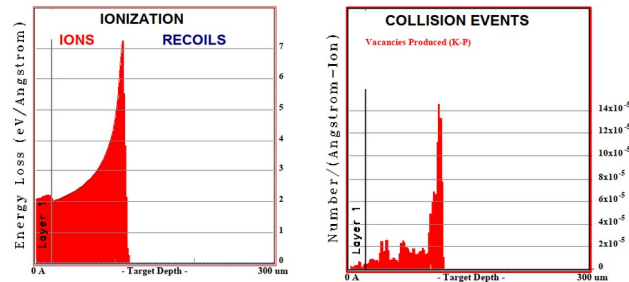


- Test radiation hardness of LGADs in high-dose limits
 - *With lateral resolution*
 - *With in-depth resolution*
- Take advantage of the LAMFI-USP infrastructure

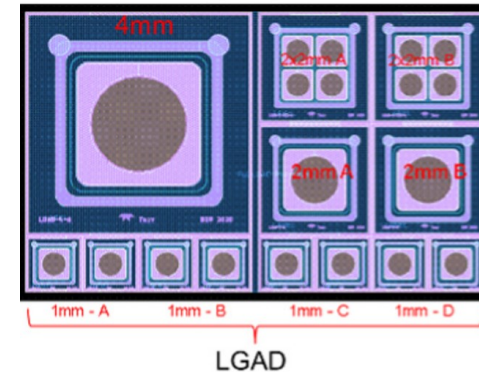
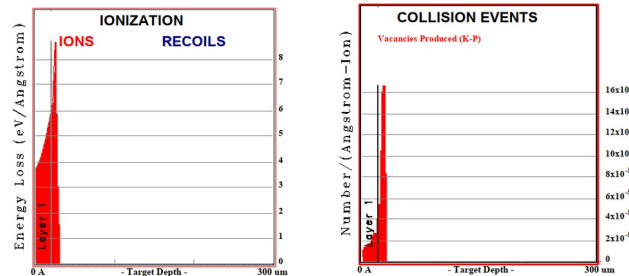
Tests with proton beams



3.4 MeV

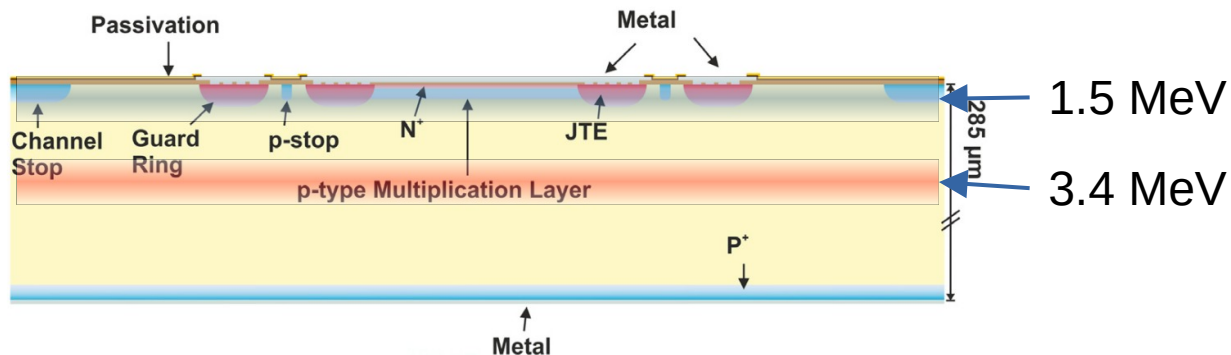
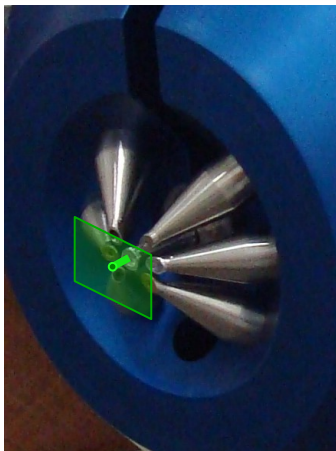


1.5 MeV

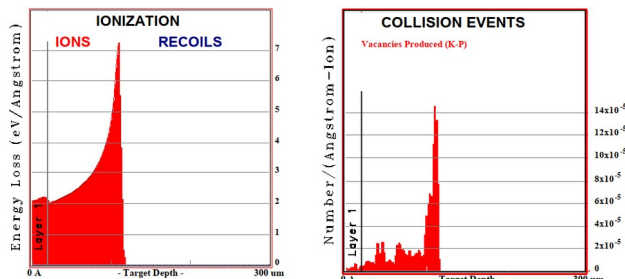


- 1,0 mm
- 200 μm
- 10 μm

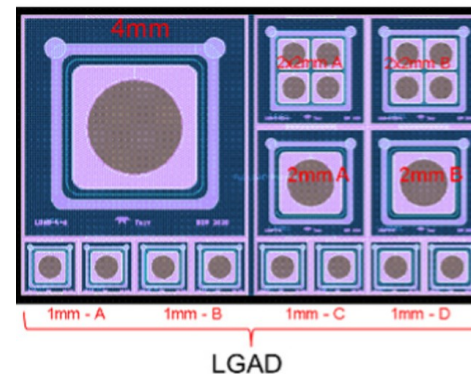
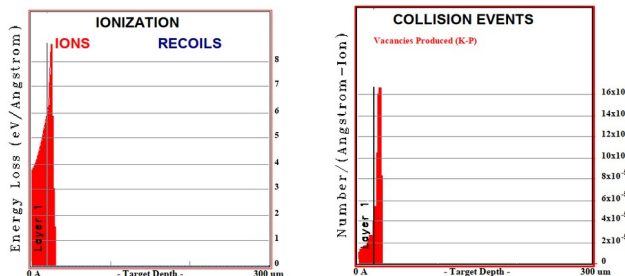
Tests with proton beams



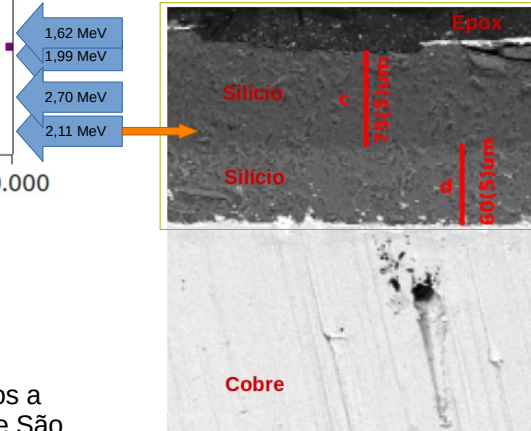
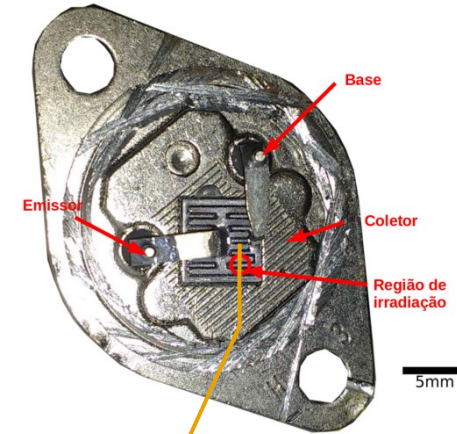
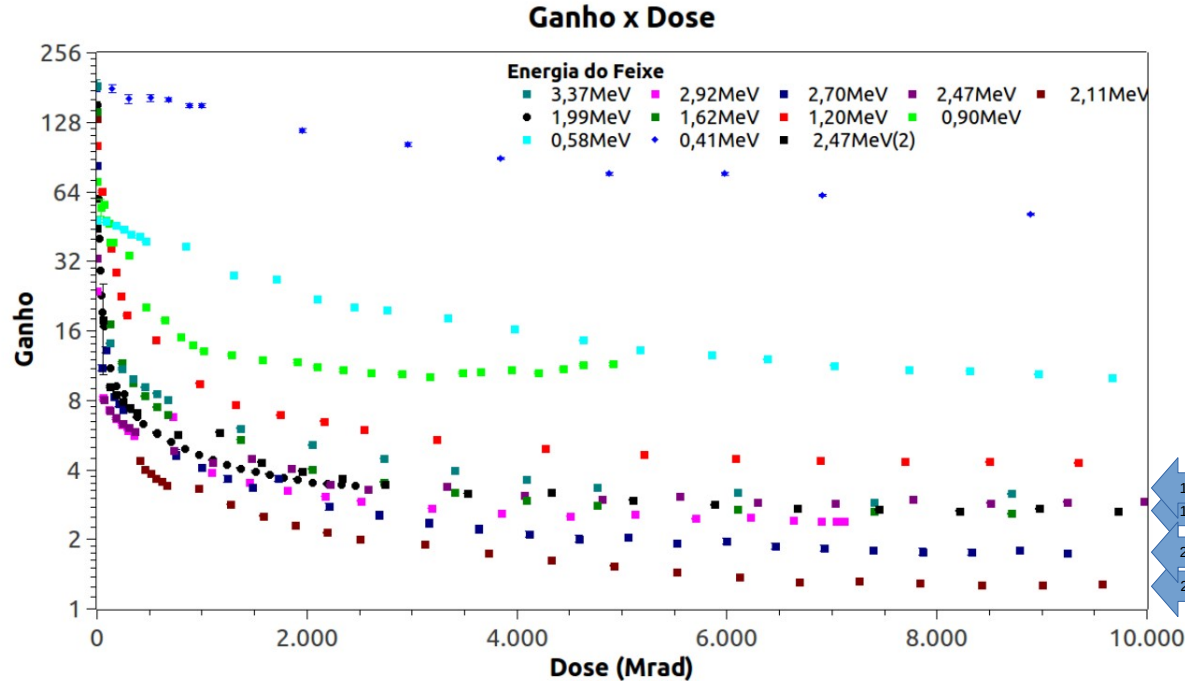
3.4 MeV



1.5 MeV

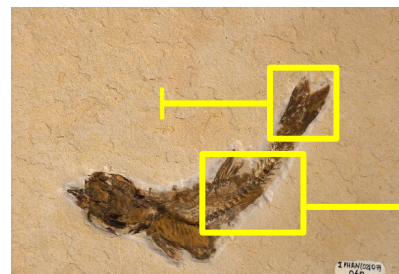
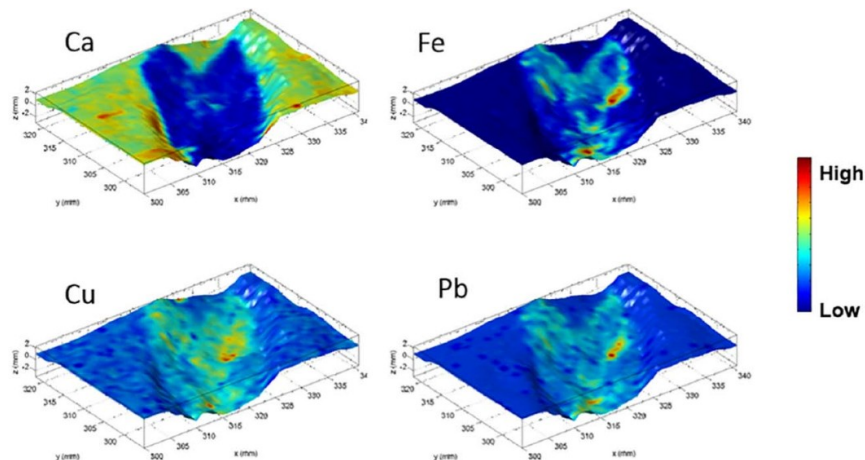
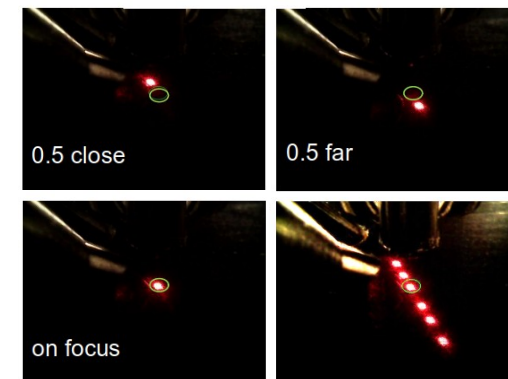
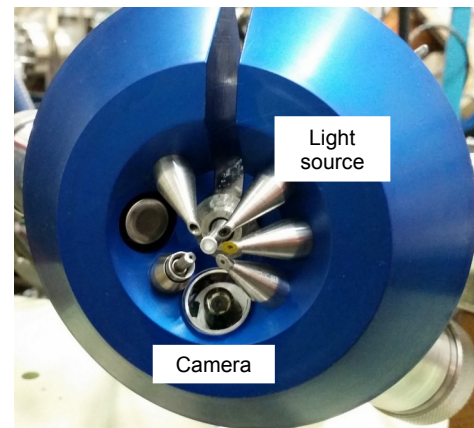


Previous experience (example)



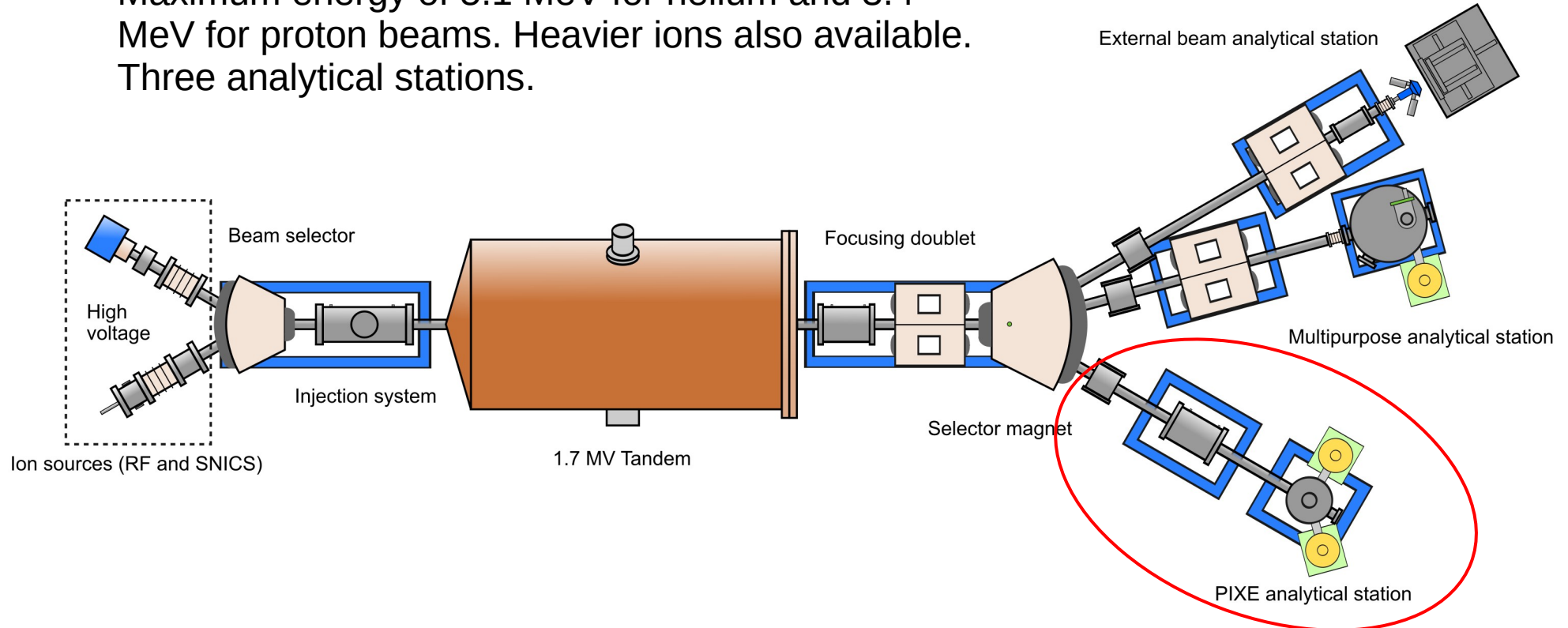
AGUIRRE, Fernando Rodrigues. Estudo sobre distribuição de cargas em semicondutores sujeitos a radiação ionizante. 2017. Dissertação (Mestrado em Física) - Instituto de Física, Universidade de São Paulo, São Paulo, 2017. doi:10.11606/D.43.2017.tde-13032017-113040. Acesso em: 2023-03-03.

- Features a machine vision system to correct for sample irregularities
 - Large areas implies sample irregularities
 - Avoid artifacts in PIXE maps by introducing some level of condition reproducibility



The project of a micro probe

Maximum energy of 5.1 MeV for helium and 3.4 MeV for proton beams. Heavier ions also available.
Three analytical stations.



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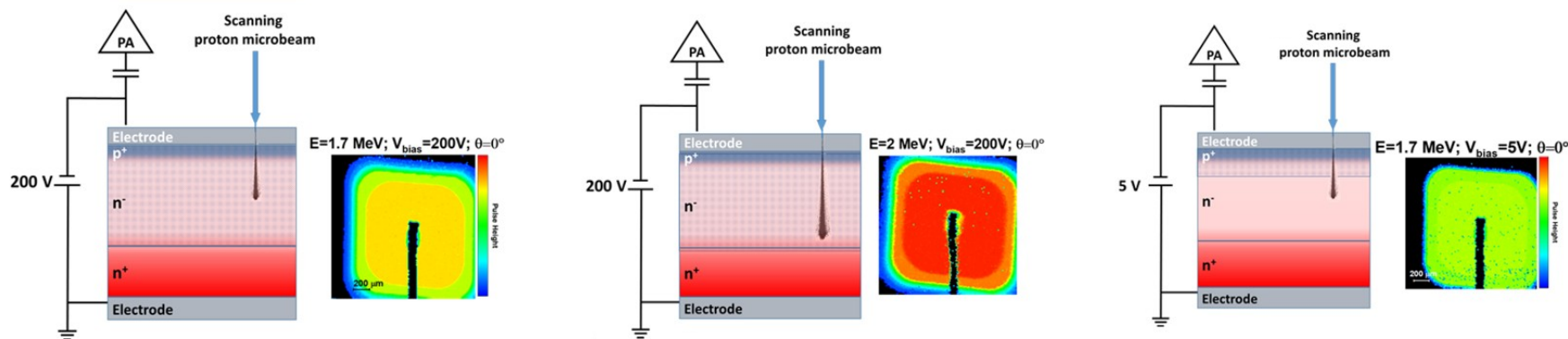


Polychromatic angle resolved IBIC analysis of silicon power diodes

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- 1 M.Sc. testing TID in the external beam setup
 - *Lateral resolution of 1,0 mm and 200 μm*
 - *Depth resolution of $\sim 10 \mu\text{m}$*
- 1 PhD testing IBIC in the new micro-probe
 - *Lateral resolution of $\sim 10 \mu\text{m}$ (?)*
 - *Depth resolution of $\sim 10 \mu\text{m}$*
- **Needs:** Support with the electronics and system automation