

# Measuring the light yield of different gas mixtures with an LAAPD

Universidade de Coimbra (LIBPhys) group

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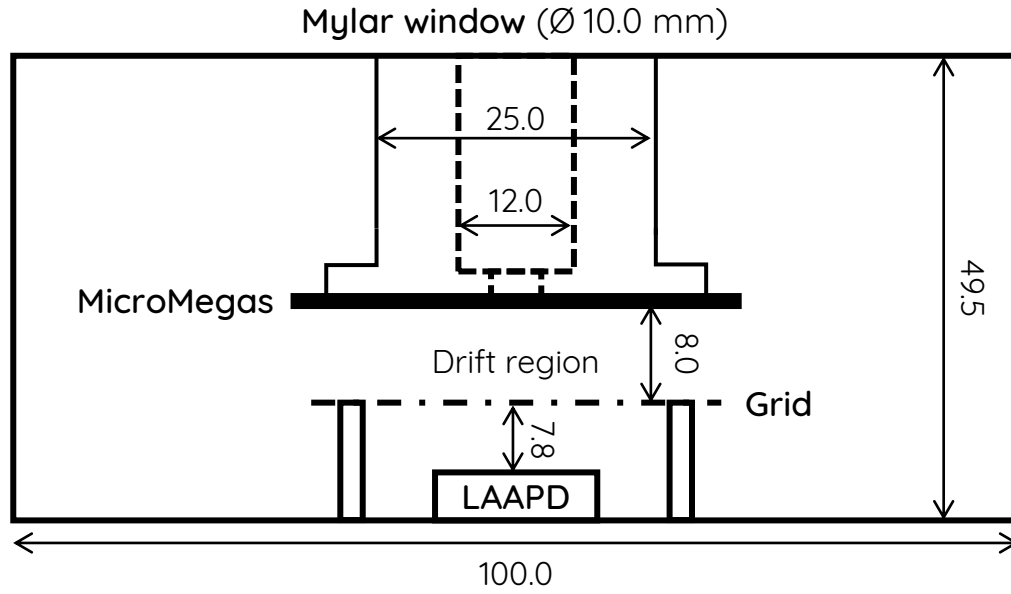


## Our Future Contributions to the Collaboration:

- **Study, development and optimization of scintillating gas mixture, to possibly reduce diffusion in gas and improve light yield;**
- Study, development and optimization of innovative amplification (GEMs) structures, to possibly improve diffusion in GEMs, light yield and energy resolution;
- Gas analyses through residual gas analyzer (RGA) machine and expertise sharing.

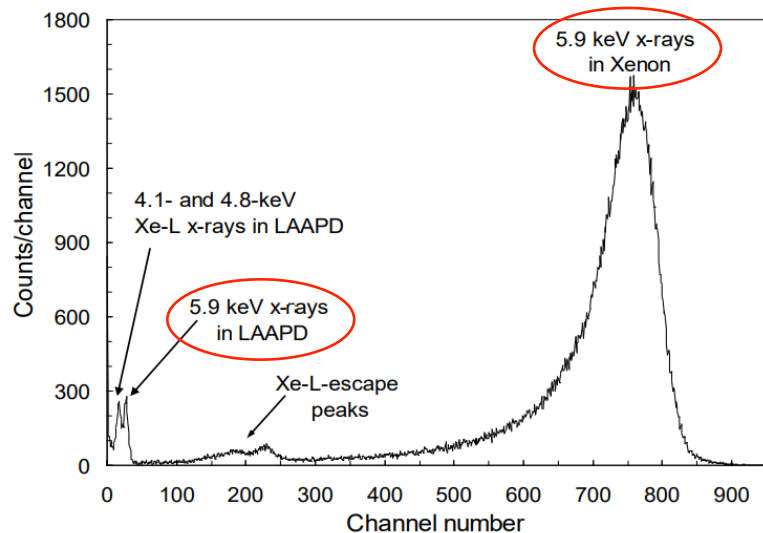
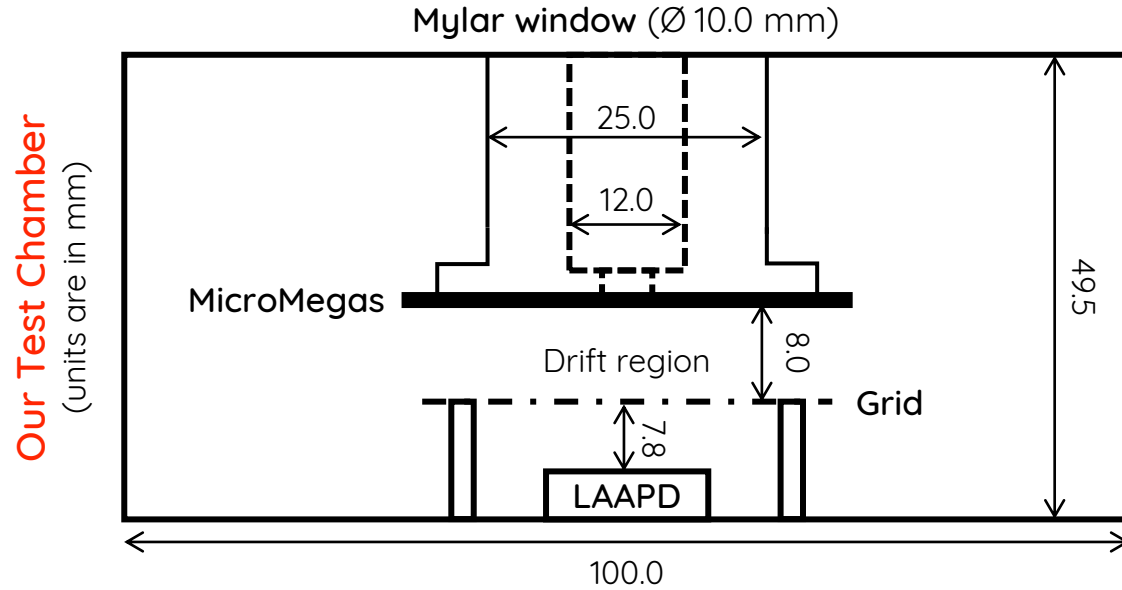
# Goal: measure the light yield of different gas mixtures

Our Test Chamber  
(units are in mm)



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measure the light yield of different gas mixtures

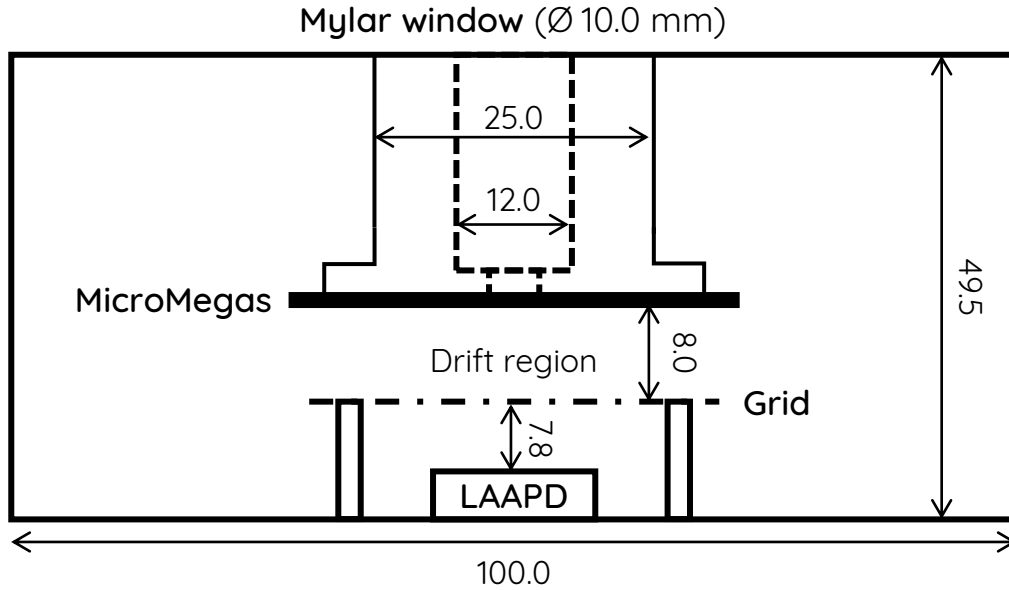


EL photons will be produced in the MicroMegas and detected by the LAAPD.

We will use the incident X-rays as a reference to determine the absolute number of EL photons.

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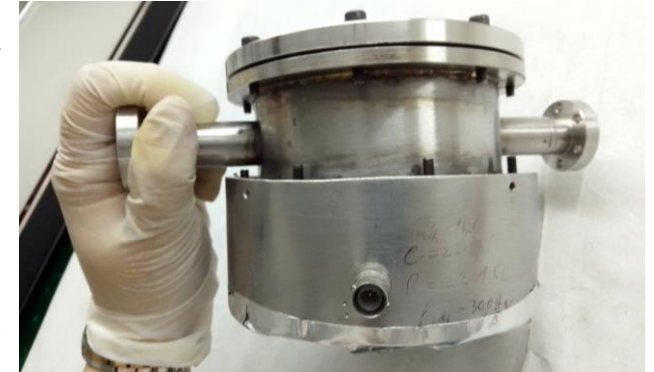
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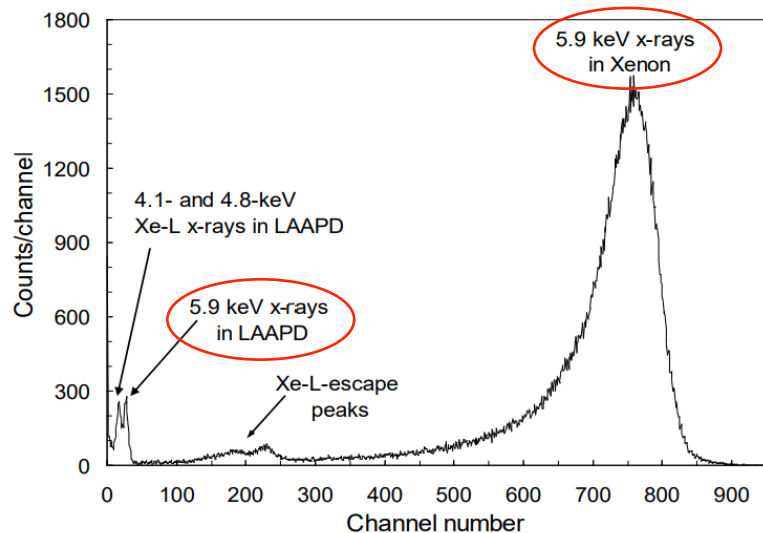
Readily adaptable for flow mode

Works in sealed mode

Can be easily adapted to high pressures



Test Chamber

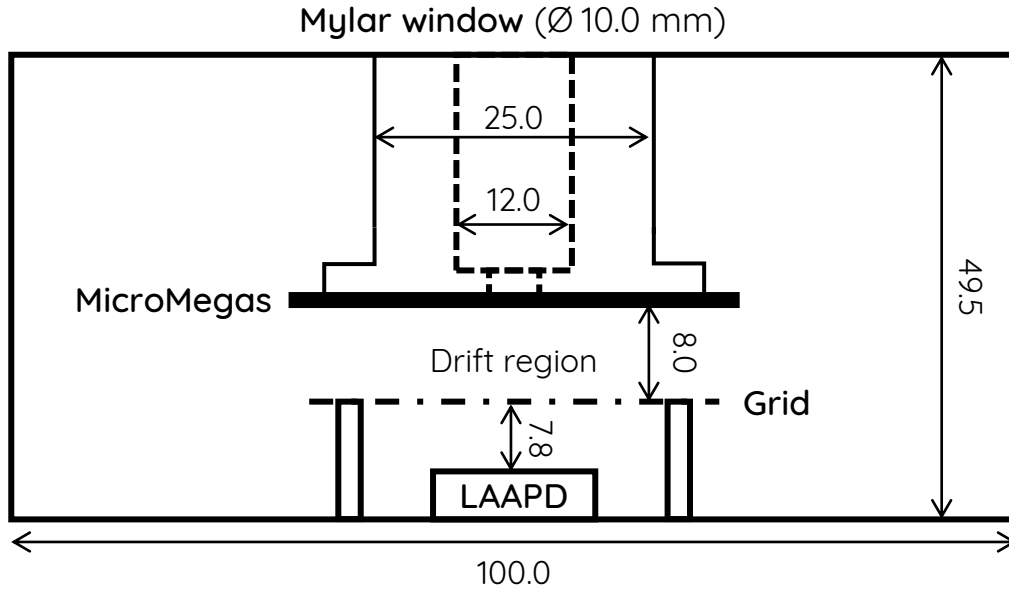


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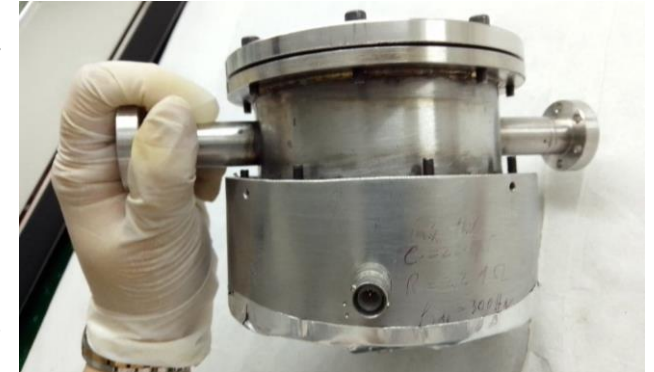
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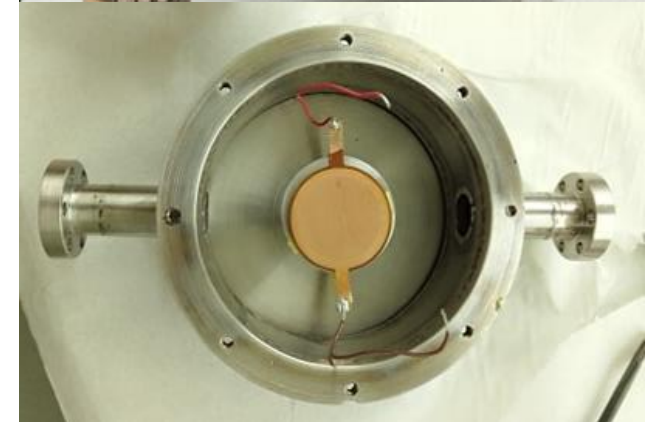


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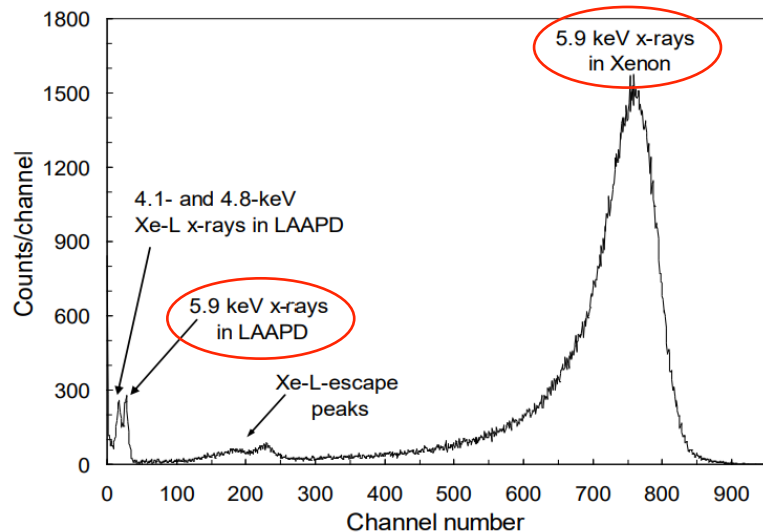


Test Chamber

- Robust
- Stable operation
- Uniform
- High gains
- High light yield



MicroMegas



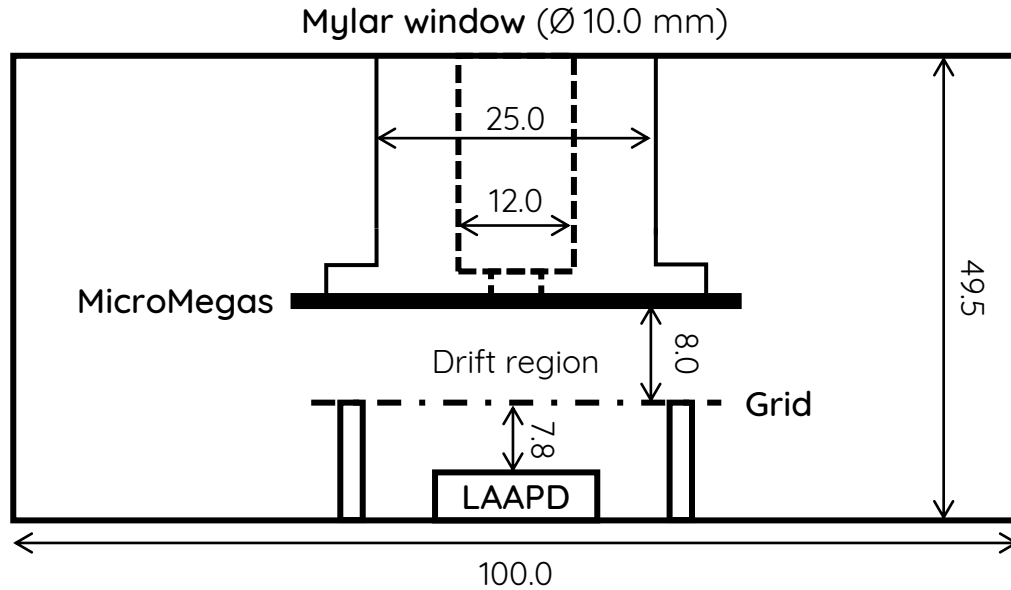
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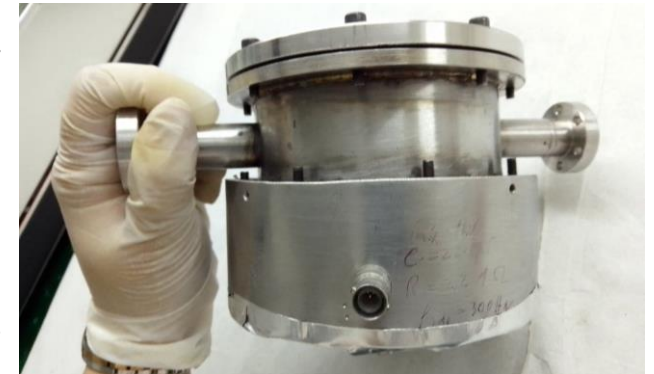
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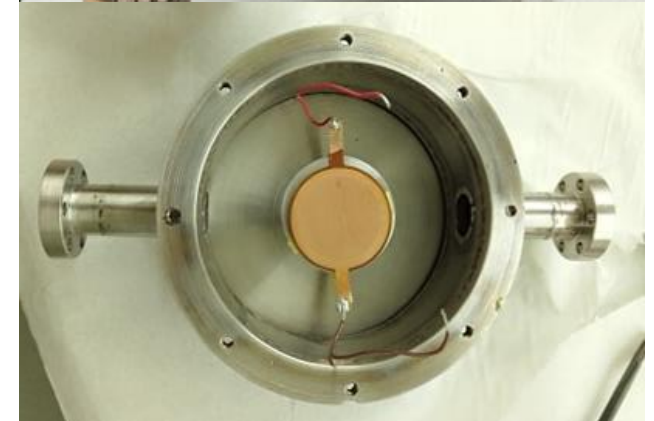
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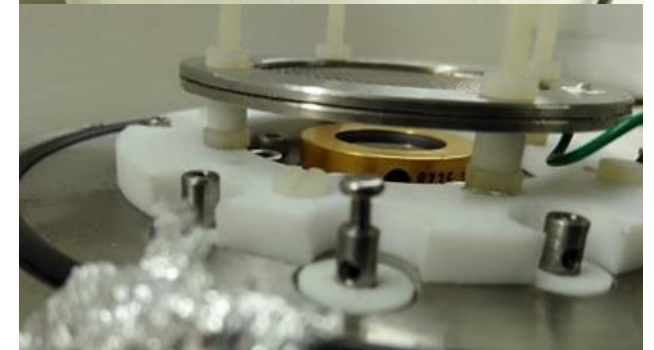
MicroMegas

Low dark current  
180 nA

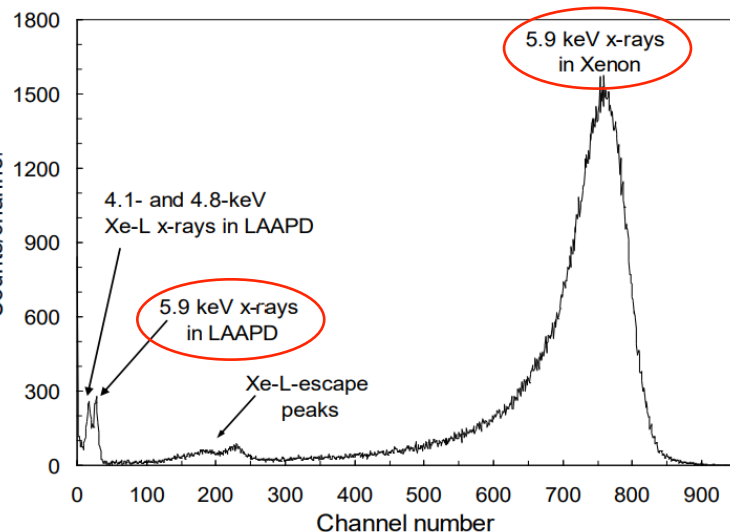
High gain  
200 @ 23°C

Active area  
201.06 mm<sup>2</sup>

Wide spectral range  
150 nm - 1000 nm



LAAPD



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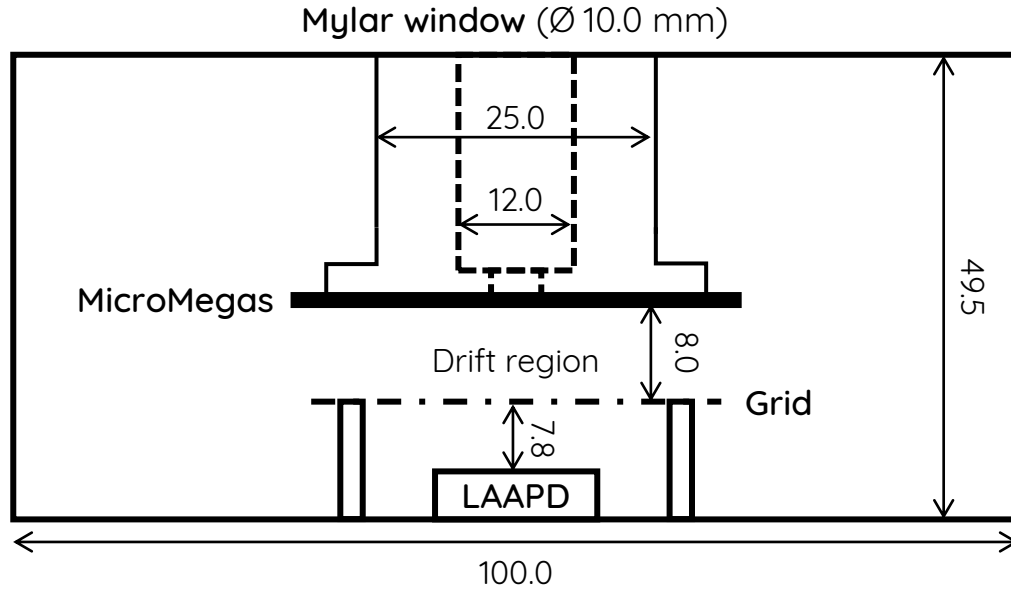


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**Test gases**

(He-CF<sub>4</sub>, He-CO<sub>2</sub>) + (CHF<sub>3</sub>, CH<sub>2</sub>F<sub>2</sub>, CH<sub>3</sub>F)

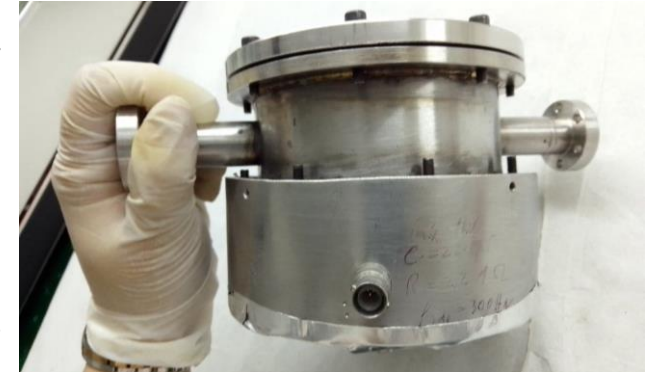
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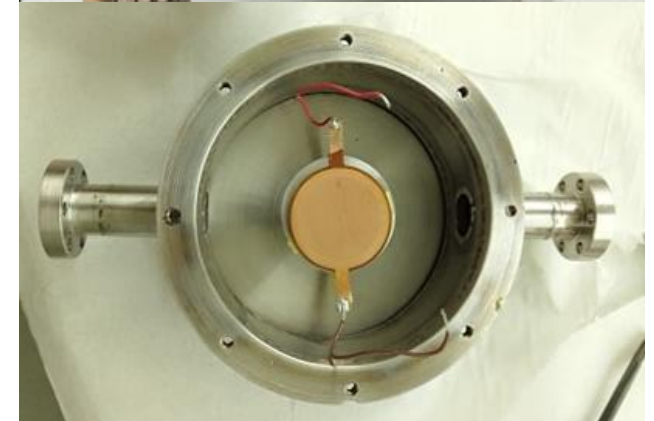
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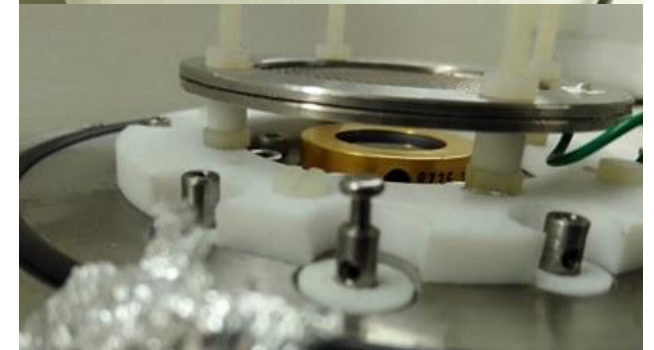
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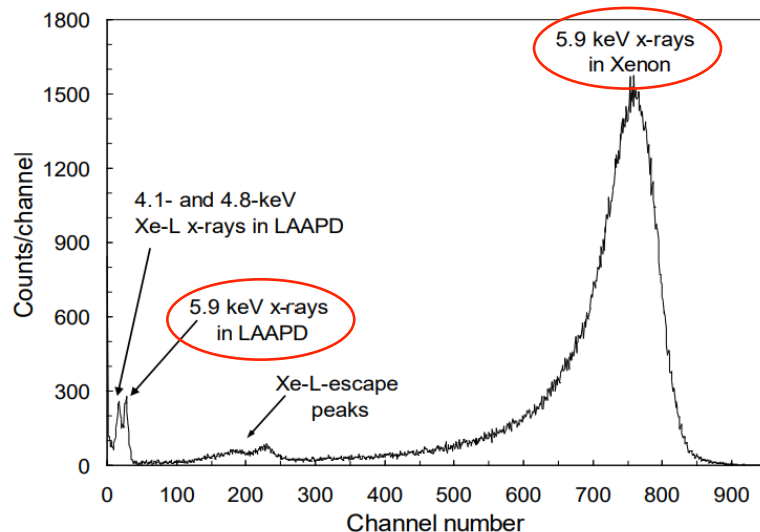
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