



Novel Gamma Radiation Detector for Finnish Early Warning Network

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Example

Detector reading:

^{137}Cs , $1 \mu\text{Sv/h}$

Possible source:

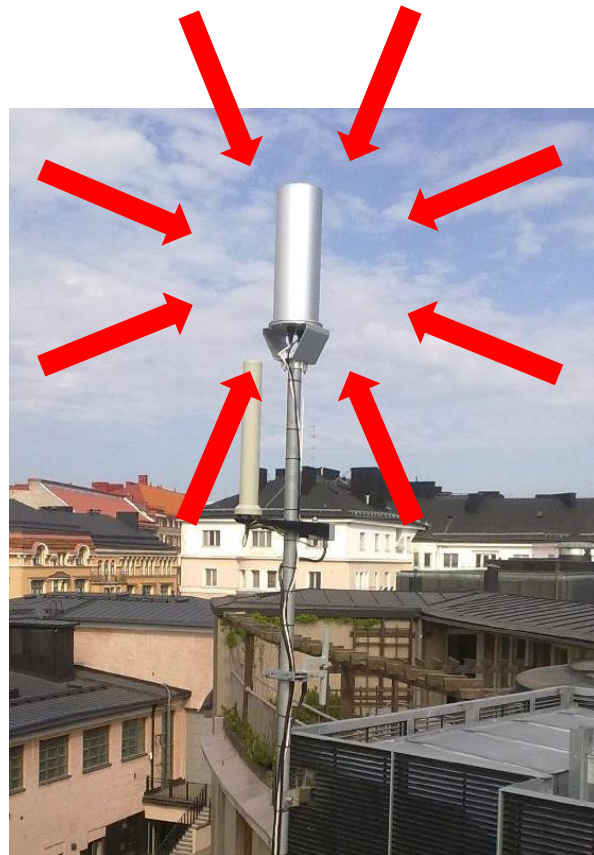
a) ^{137}Cs fallout on the ground

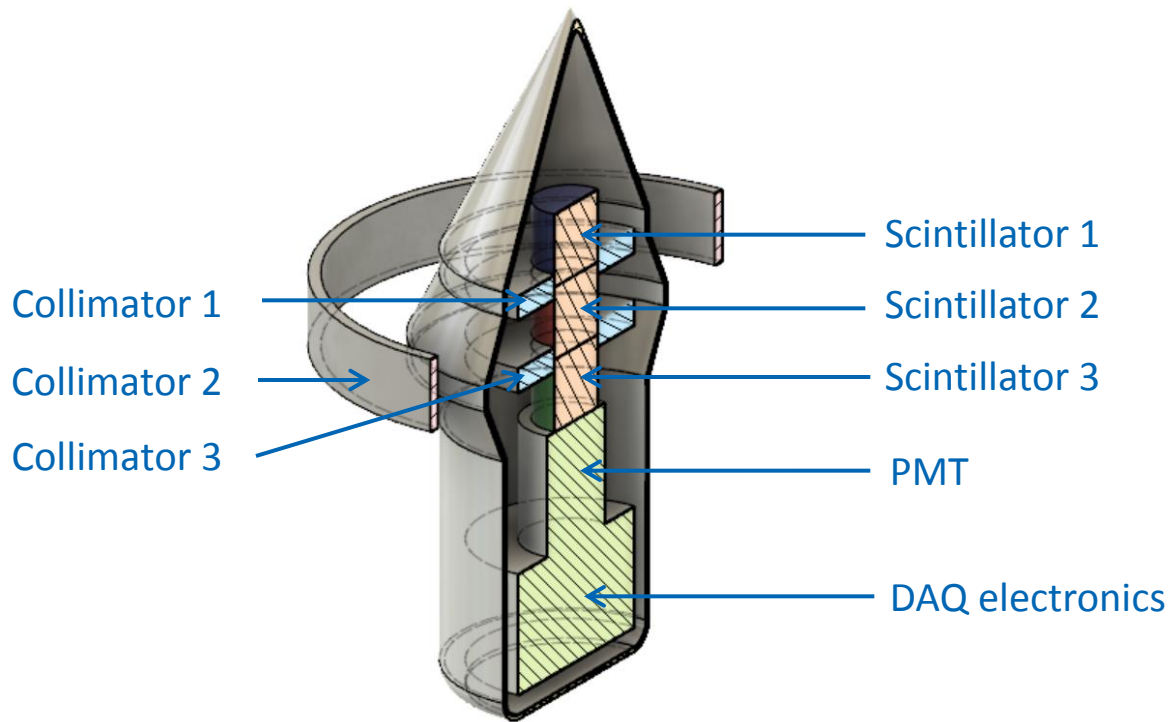
700 kBq/m^2

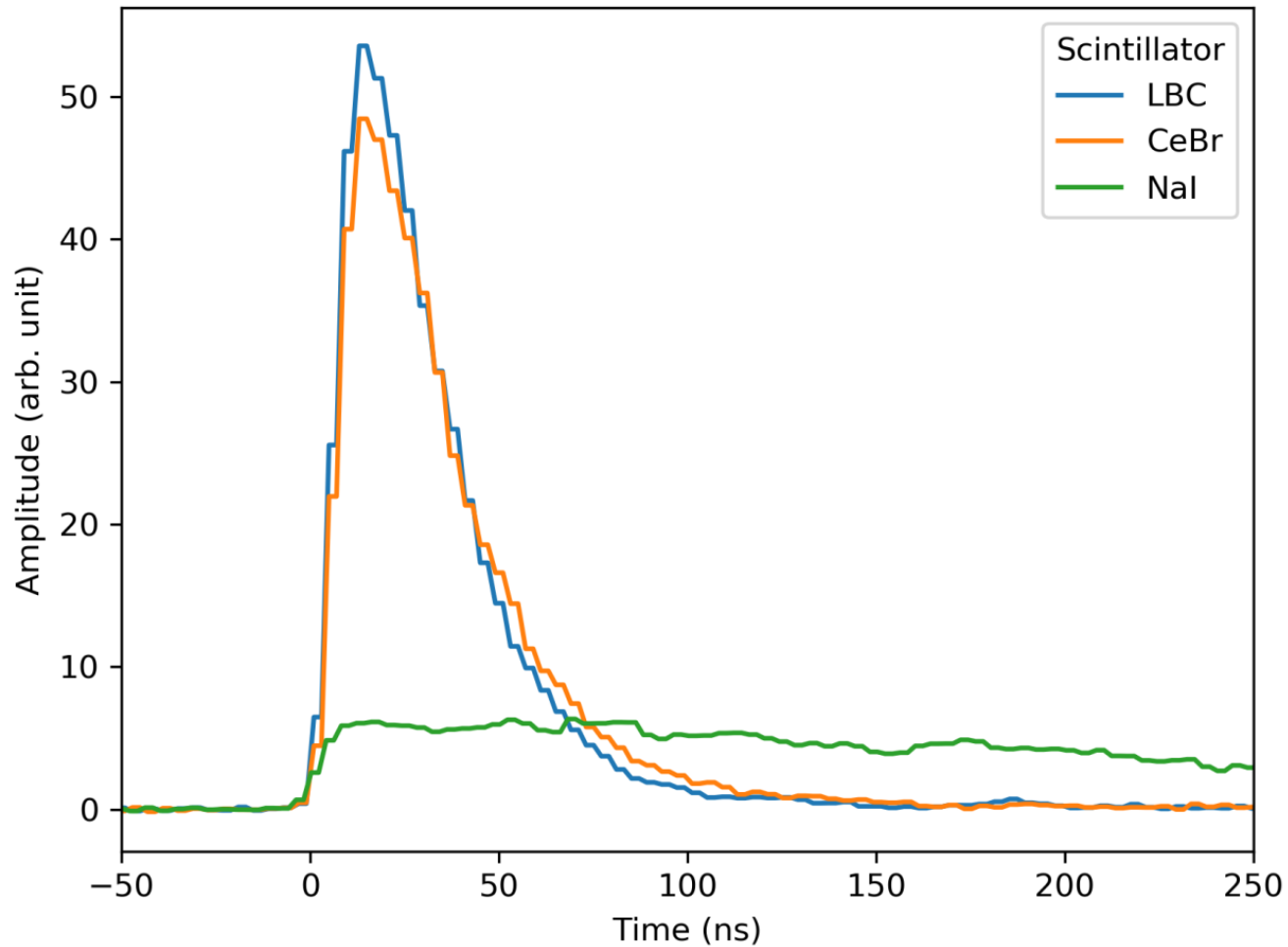
b) Airborne ^{137}Cs

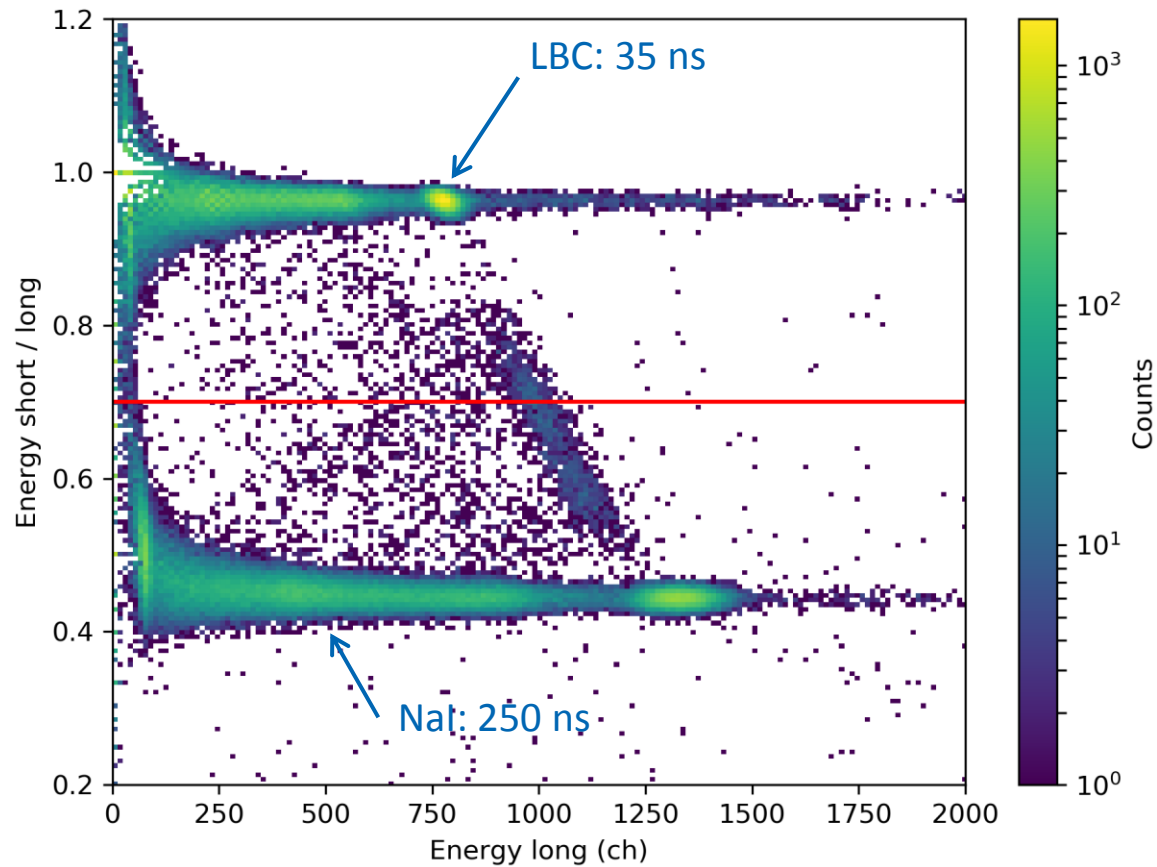
10 kBq/m^3

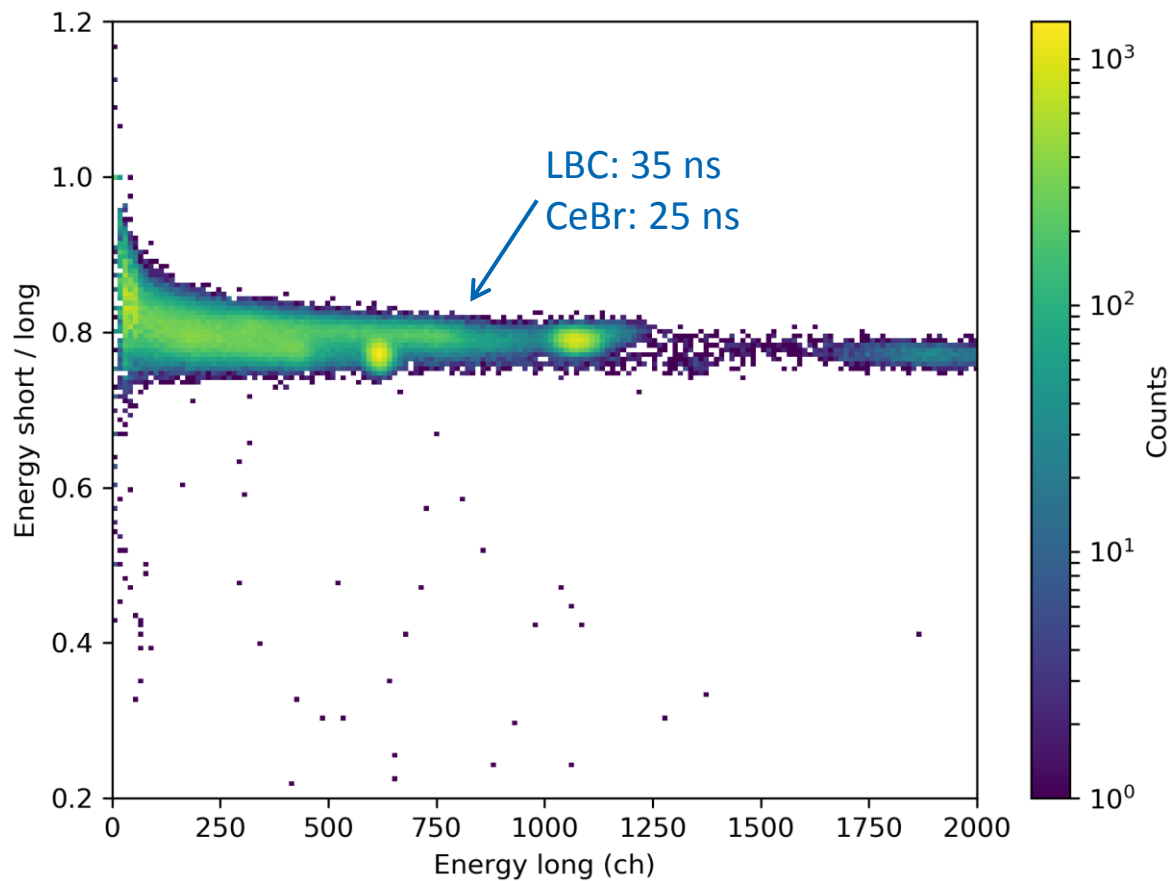
Internal dose: $70 \mu\text{Sv/h}$



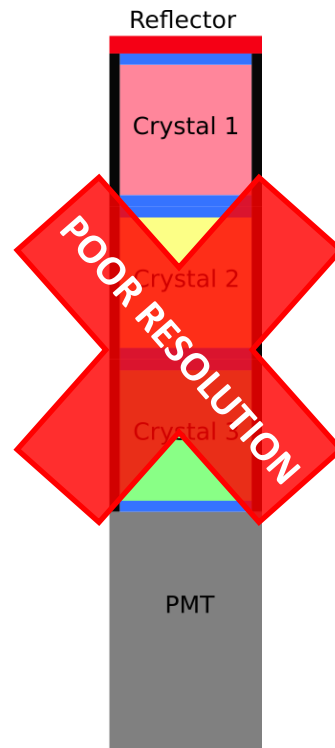
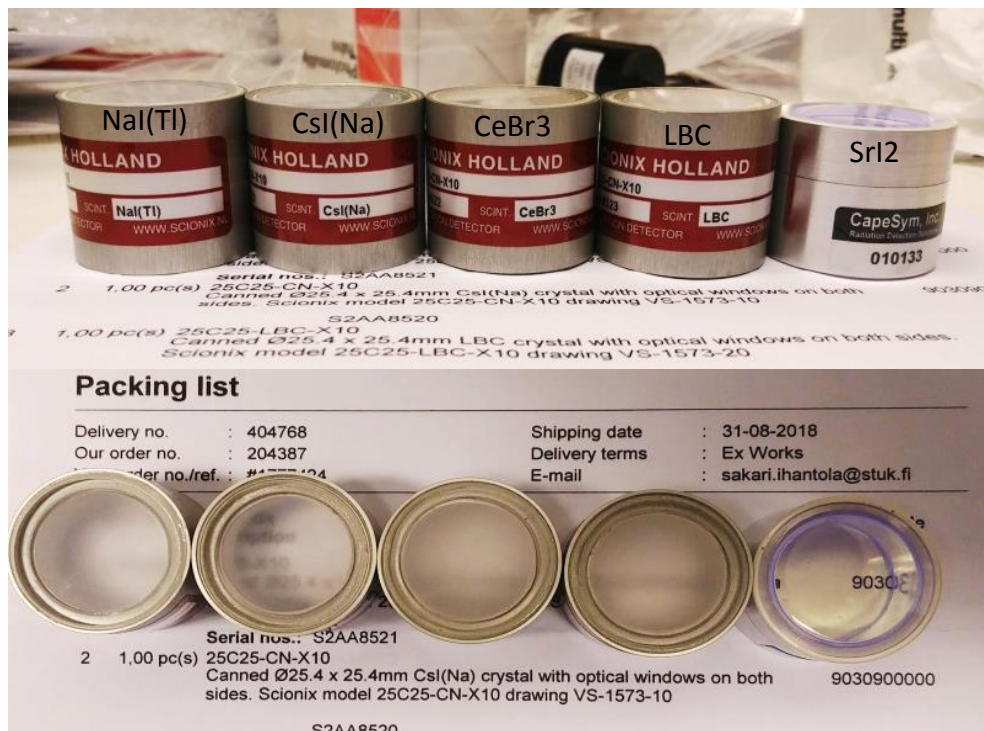








Scintillator material tests





20 mm

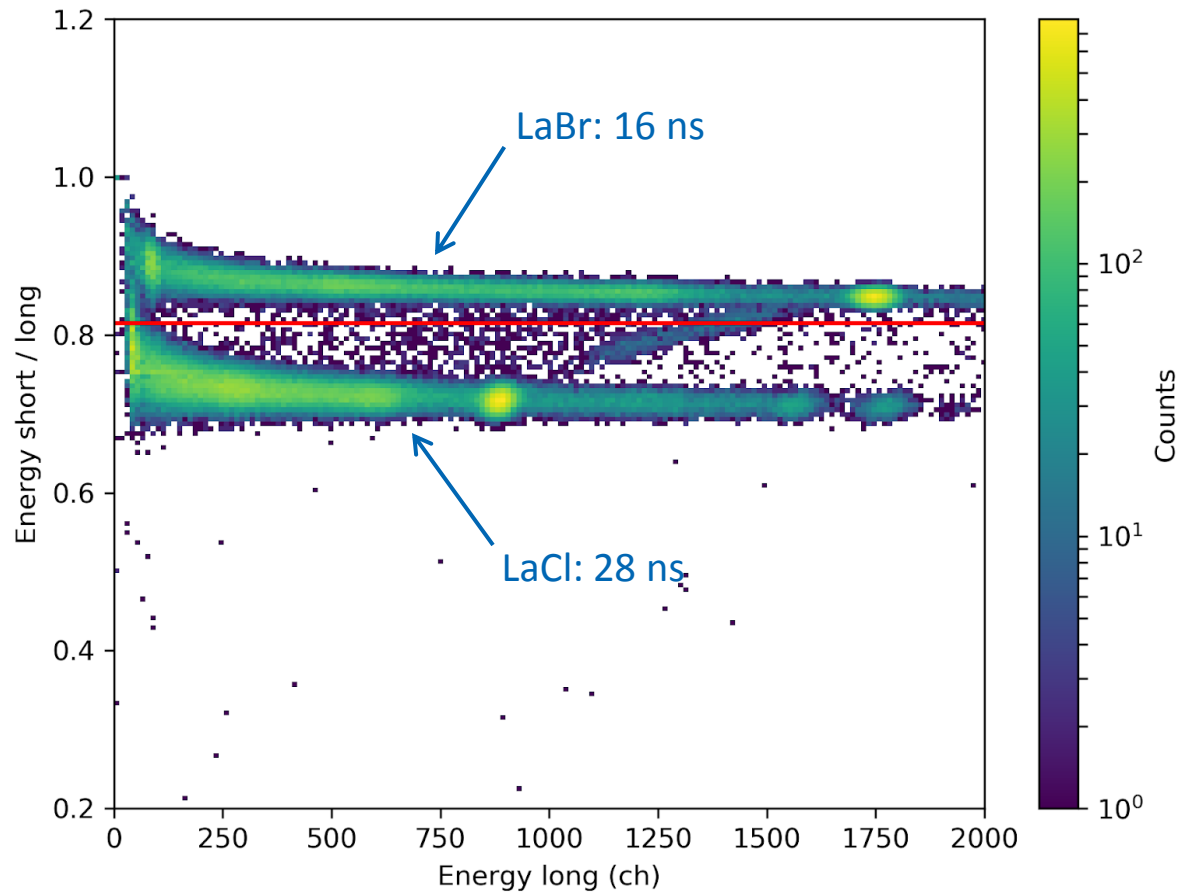
$\text{LaBr}_3(\text{Ce})$

30 mm

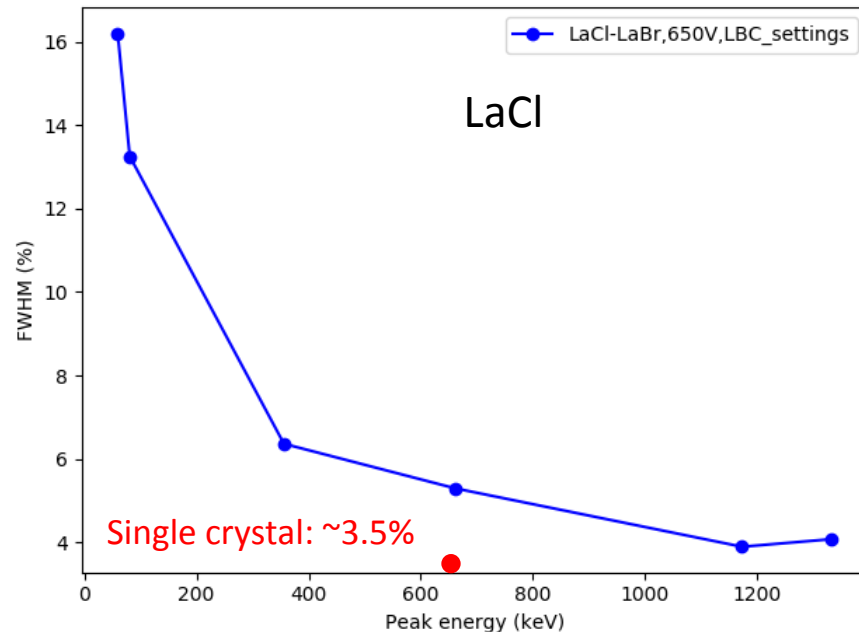
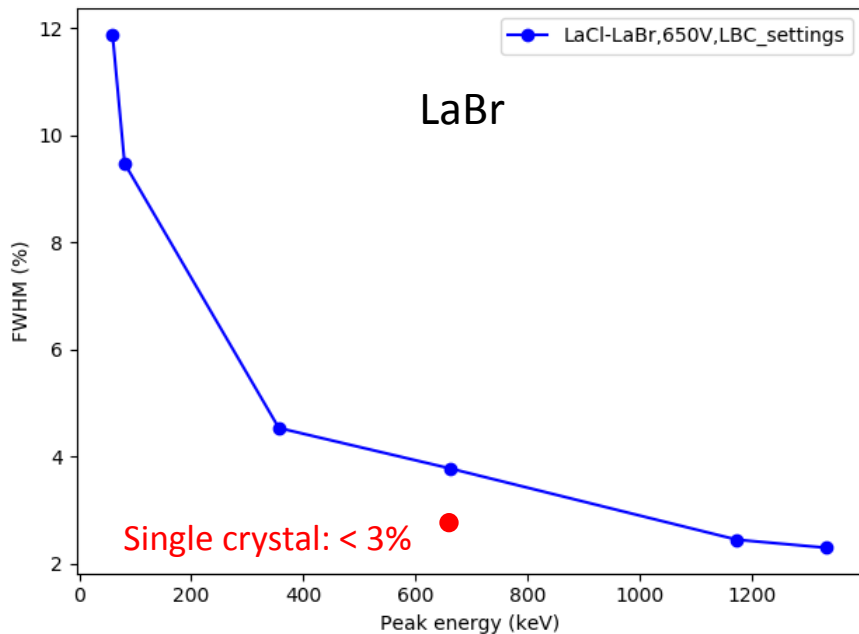
$\text{LaCl}_3(\text{Ce})$

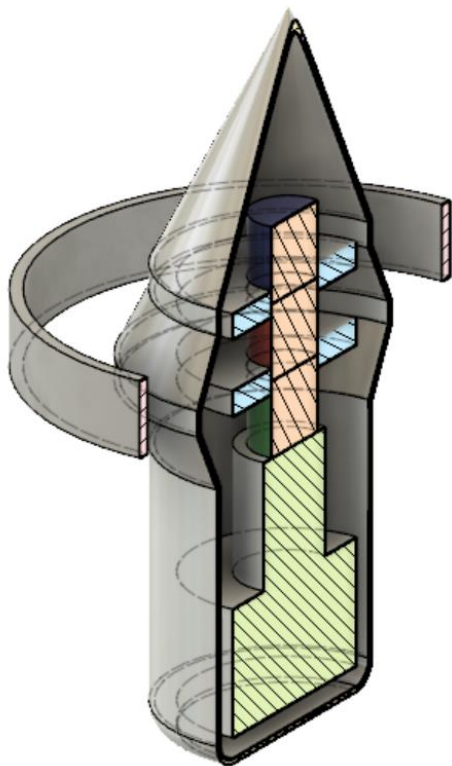
50 mm

PMT

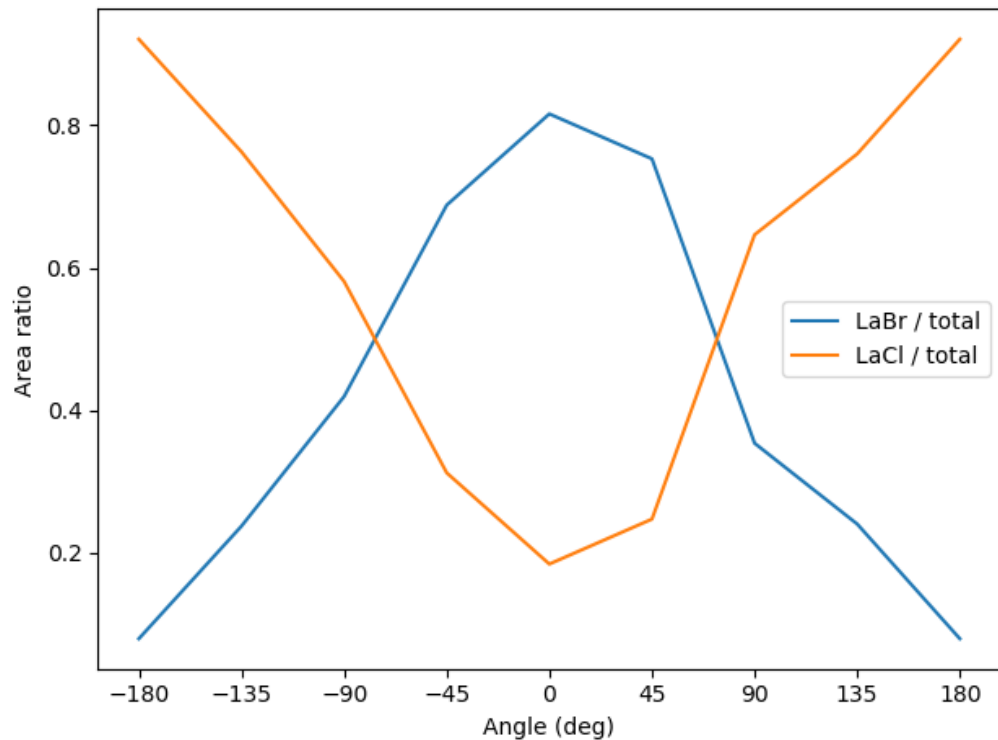


Energy resolution





Directionality



Summary

- Need to distinguish between airborne radioactivity and fallout
- Can be achieved with current laboratory prototype
- Next challenge: include detection of detector contamination
- Field tests will follow
- Detector operational by the end of 2021