



Housing for Passive Radiation Sensors

Ch. Ilgner, February 15, 2007

Proposal for a versatile easy-to-use passive sensor housing for radiation monitoring in both accelerators and experiments.

Optimized in view of production, performance in radiation fields and handling.

Comprising alanine, p-i-n diode, RPL and TLD sensors.

Thanks to Barbara Obryk and Markus Fürstner.



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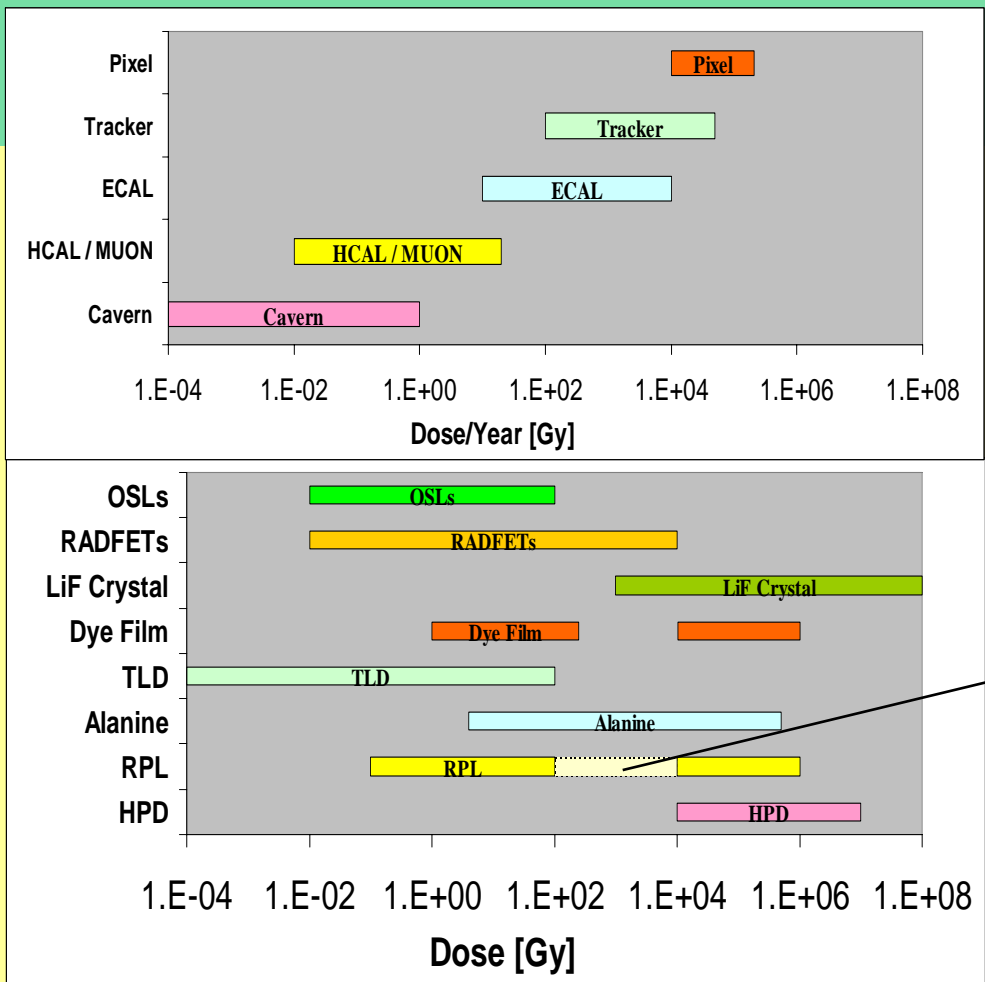
Properties

Advantages:

- all passive sensors + p-i-n diode in one common housing
- minimized exposure time during deployment/harvesting
- minimized turnaround time in the lab
- material (PE) complies with IS41 (use of plastics in the LHC underground installations)
- optimized production (mill-cut, few parts; casting becomes only affordable from ~50.000 pieces on)
- bar-code operation minimizes errors
- new readout instruments and procedures (RPL: M. Fürstner, TLD: B. Obryk)
- Inter-departmental project

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Dose Ranges



expected year-doses
in CMS at $10^{34} \text{ cm}^{-2} \text{ s}^{-1}$
luminosity

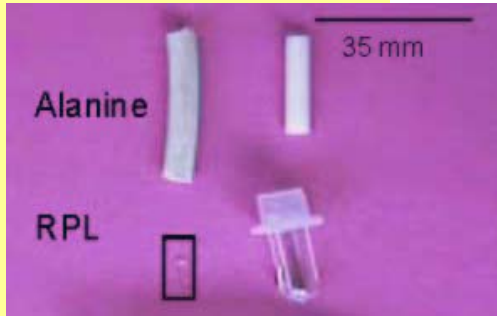
problematic ambiguous
region due to optical
degradation (solved)

(I. Floret, M. Moll)

There is a new RPL reader being produced by TS/RP and Geneva engineers' school that is capable of reading the ambiguous region, see talk by M. Fürstner.

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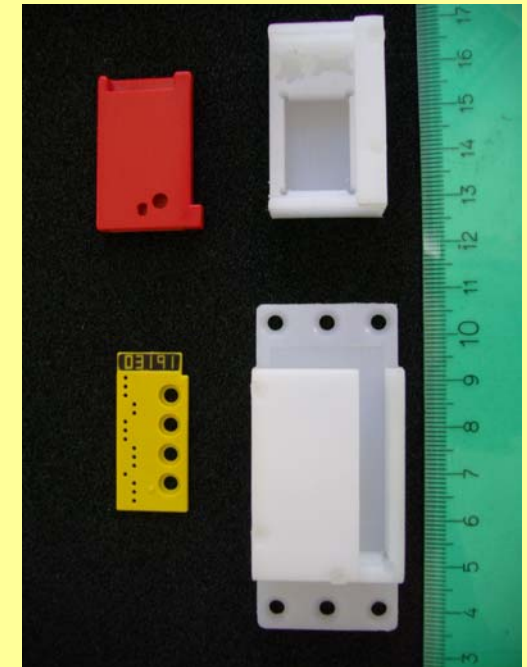
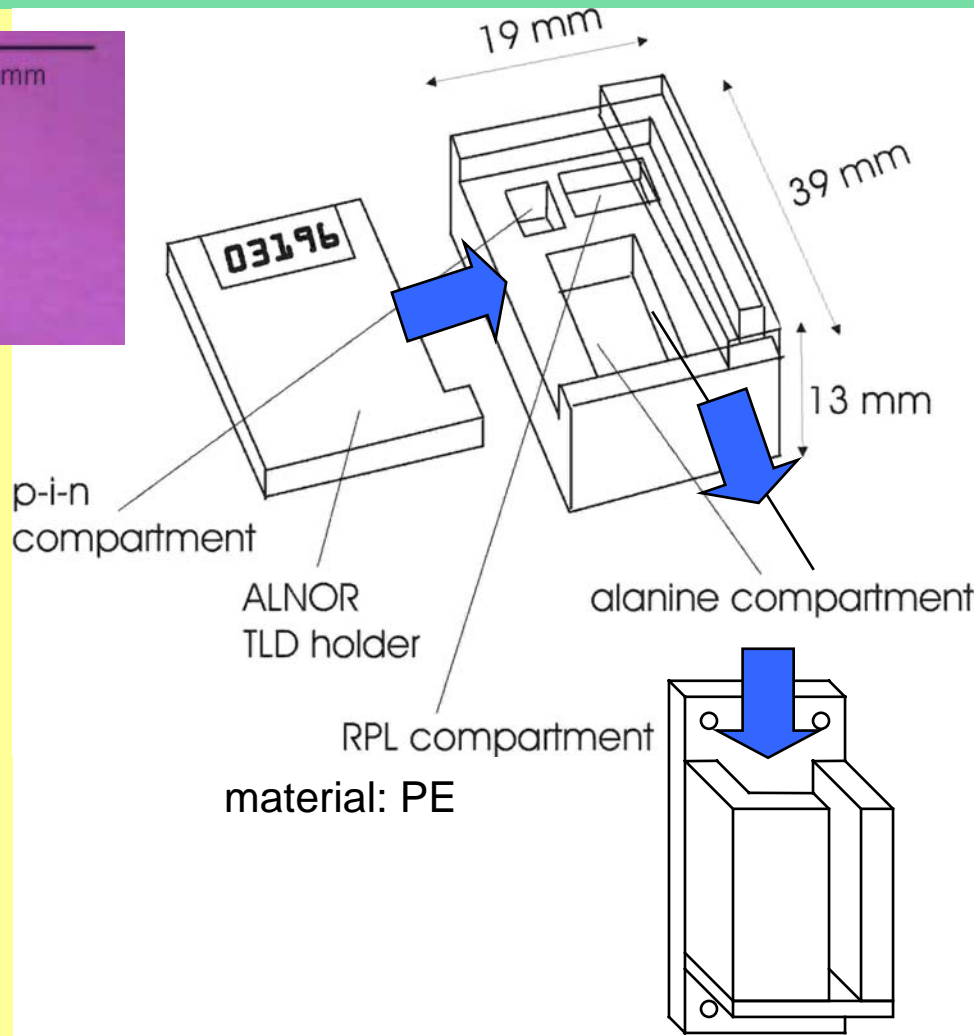
Geometry



(picture:
I. Floret)



TLD
(Harshaw)



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Conclusion

An easy-to-use and tested sensor-housing concept is available to everybody who needs it. It is optimized in several respects.

TLD, RPL and alanine cover a dose range from 1 mGy to 10^6 Gy for the total dose. Thermal Neutron sensitivity with TLD.