

Status update on SPECTRAP detectors

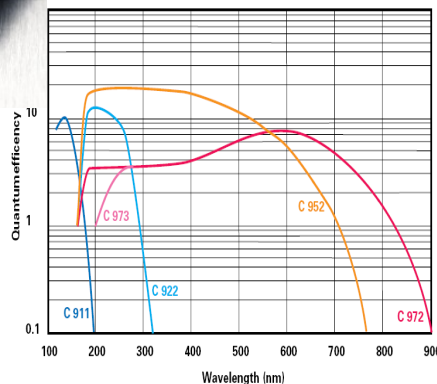
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- Detector systems
- Developments regarding NIR detection

UV region

$^{209}\text{Bi}^{82+}$ (200-400 nm)

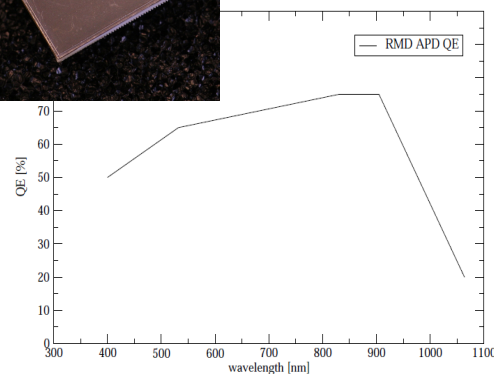
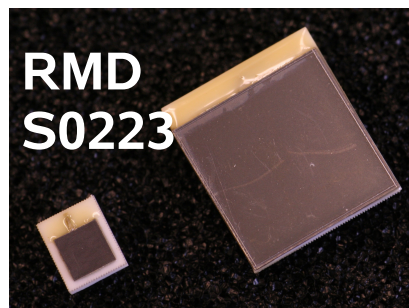
PerkinElmer
C1993P



Visible to NIR

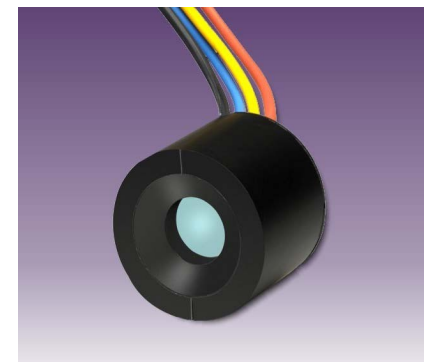
$^{207}\text{Pb}^{81+}$ (400-1050 nm)

RMD
S0223



NIR region

$^{209}\text{Bi}^{80+}$ (1050 -1550 nm)



Intevac IPD

Model	C1993P	RMD S0223	Intevac IPD
Type	Channel PMT	APD	Hybrid PMT
Active area	Ø = 15 mm	Ø = 2 mm	Ø = 1 mm
Wavelength	200-400 nm	400-1050 nm	1050-1550 nm
QA	18%	20-75%	10-20%
Dark counts	20 Hz	10-100 Hz	100 kHz
Comment	tested at ESR	under test at Uni Münster	will be ordered

To detect a resonance with $n_\sigma = 3$ significance we need to detect

$$S = s \cdot t \cdot \epsilon \geq n_\sigma \cdot \sqrt{d \cdot t}$$

s = signal rate

t = measurement time

ϵ = efficiency

d = dark count rate

photons.

The required time to do so is at least: $t = \left(\frac{n_\sigma}{s} \right)^2 \frac{d}{\epsilon^2}$

so with new numbers given for the IPD we get for the 1550 nm line:

$$t = \left(\frac{3}{3400} \right)^2 \frac{1 \cdot 10^5}{(0.10 \cdot 0.65)^2} = 18 \text{ s}$$

for the required time per measurement point ... this looks feasible !