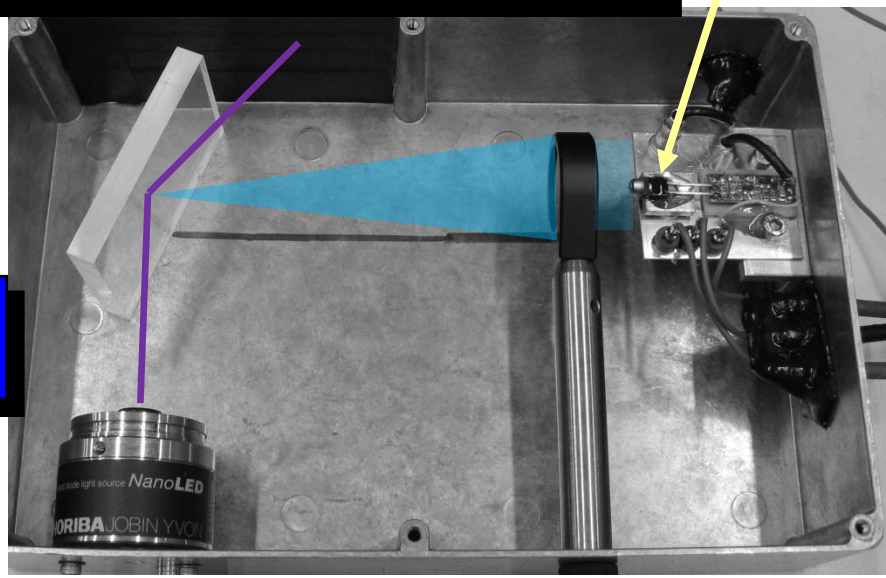
SiPM characterisation for low light yield applications

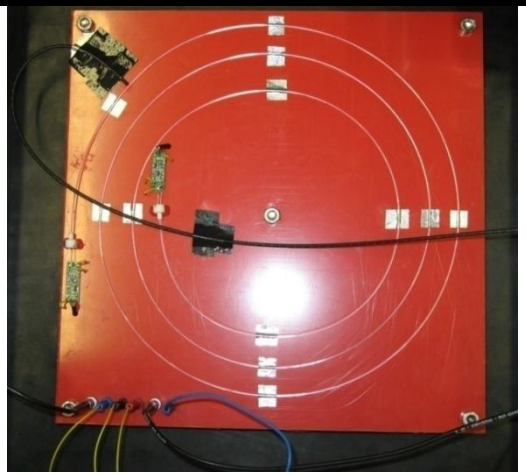
SiPM

- UV fast pulsed laser (100 ps) excites scintillator
- reflected UV light is absorbed by black screen
- scintillator light is attenuated by ND filter
- only a few photons arrive to the SiPM



Particle detection efficiency for a 2m long 1mm diametre fibre with SiPM read-out

Threshold (nº pixels)	Efficiency (%)
< 1	91
< 2	76
< 3	56
< 4	35



Change of characteristics after irradiation with 31 x 10^8 electrons of 14 MeV energy

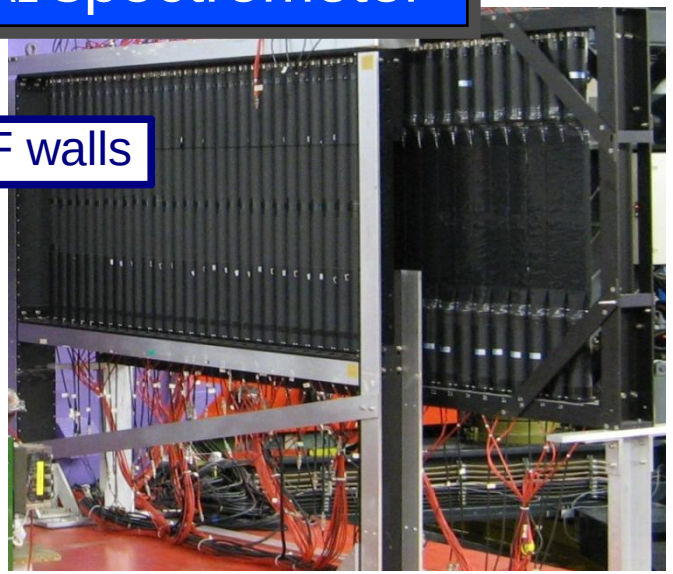
- increase in dark count rate, *r* (cannot explain spectra alone)
- major change in gain uniformity, σ_G

parameter	before irradiation	after irradiation
A (mV)	9.86	8.93
σ_G	0.056	0.12
r (MHz)	4.54	17.24
p_{opt}	0.022	0.023
p_{aft}	0.08	0.12
τ (ns)	7.0	7.1
λ (ph.)	4.0	3.9

Use of SiPM in the KAOS/A1 spectrometer

2 MWPC

2 TOF walls



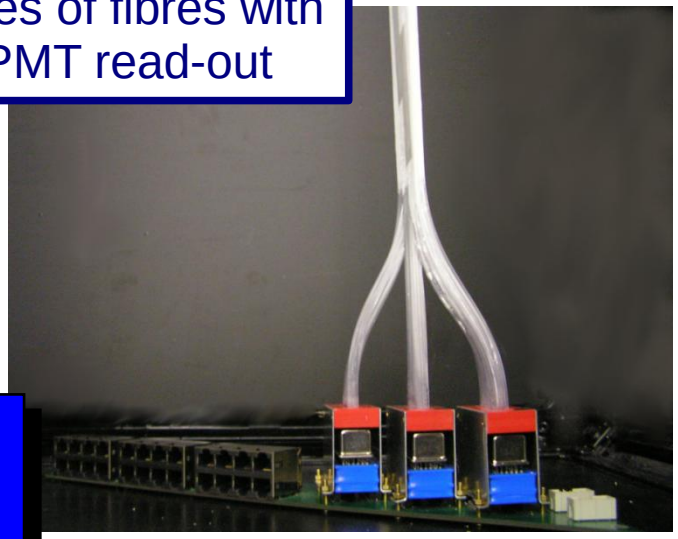
hadron arm

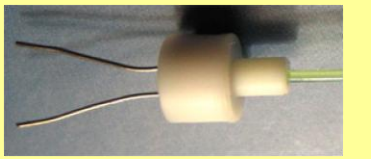
target

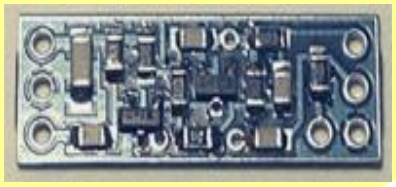
dipole

electron arm

2 planes of fibres with MaPMT read-out







2 planes of fibres with SiPM read-out

Detector with 600 SiPM under construction:
radiation hardness, detection efficiency, and dark count rate sufficiently good for use in spectrometer