

Beam monitors

DREAM & MAGIC. ... and more



• Requirements

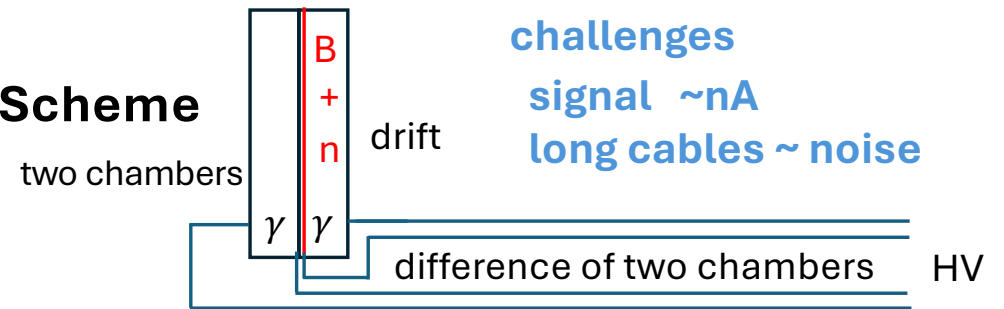
- monitoring beam line
- calibration - alternative to proton charge
- robust, stable for long time
- electronics outside bunker
- high dynamic range
- low background
- low perturbation

• Nice to have

- single event sensitivity

Ionisation beam monitor (IBM - CDT)

Scheme



challenges

signal $\sim nA$

long cables \sim noise

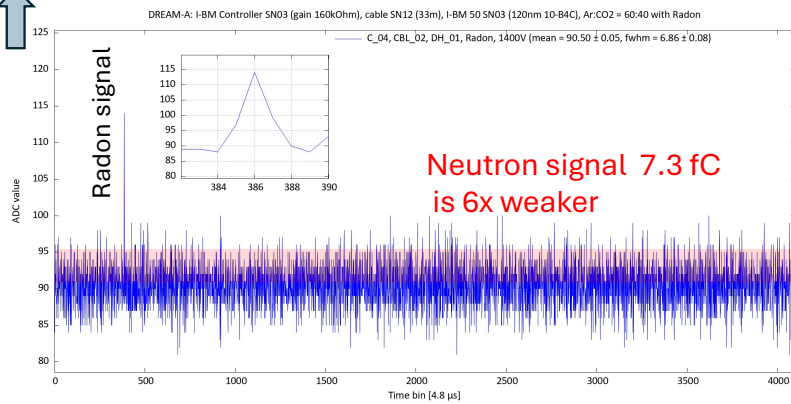
- same readout as CDT detectors
- current signal – no gain / no avalanches
- gamma discrimination
- 0.005 detection efficiency $\sim 10^6$ n/pulse @ 100 μ s resolution
- low noise - challenge

FAT

Range of amplifier

in bunker monitor

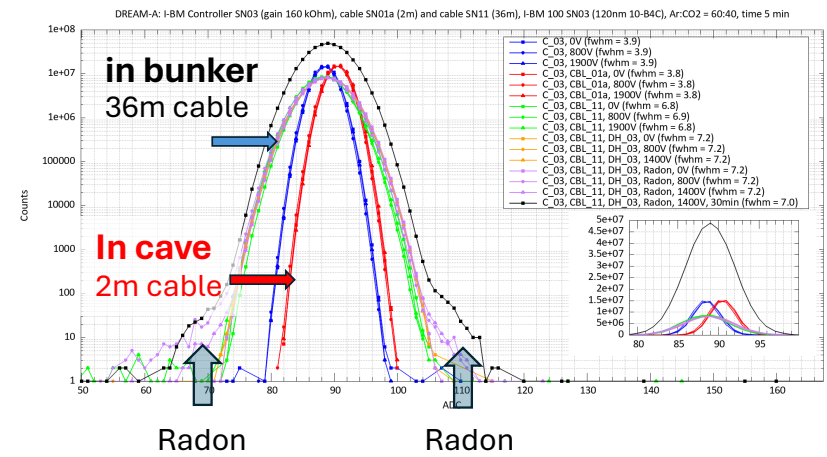
2^{18} ↑



noise

4.8 μ s time bins

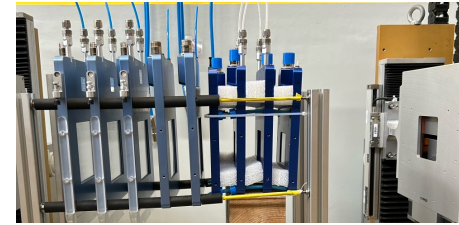
Signal & noise distribution



amplification can be 50x larger
=> sensitive to single events

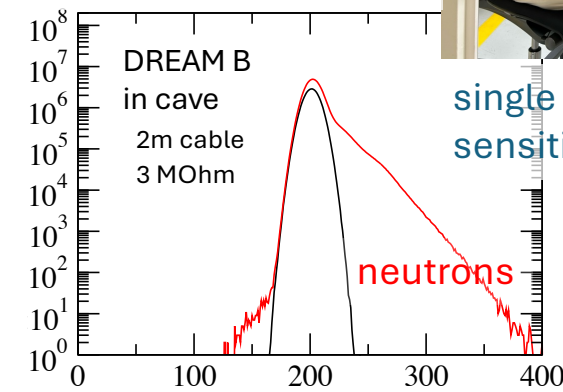
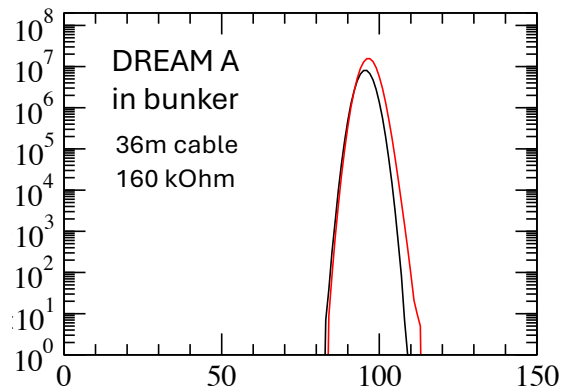
Neutron test

IMAT – ISIS and AMOR - PSI



Thanks for great collaboration
Ioannis and Rania
ESS detector group

Signal & noise
distribution



single event
sensitivity

range
 2^{18}



TOF spectra



same for MAGIC

now waiting for installation

