Tracking radiation using TimePix

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Nuclear radiation overview

- Nuclear radiation refers to propagation of energy through space or a medium in form of electromagnetic waves or particles.

Ionizing radiation

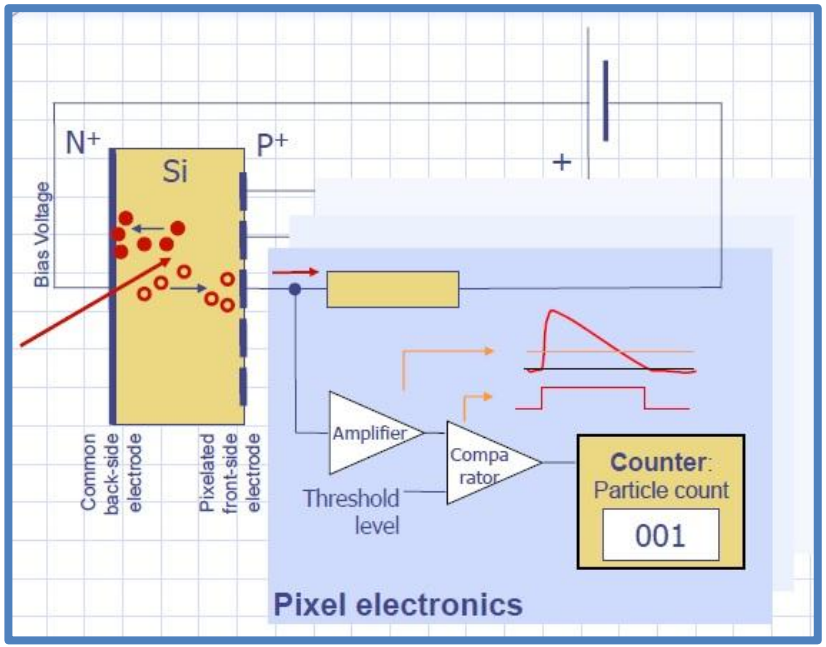
- Charged particles
- Alpha, beta,

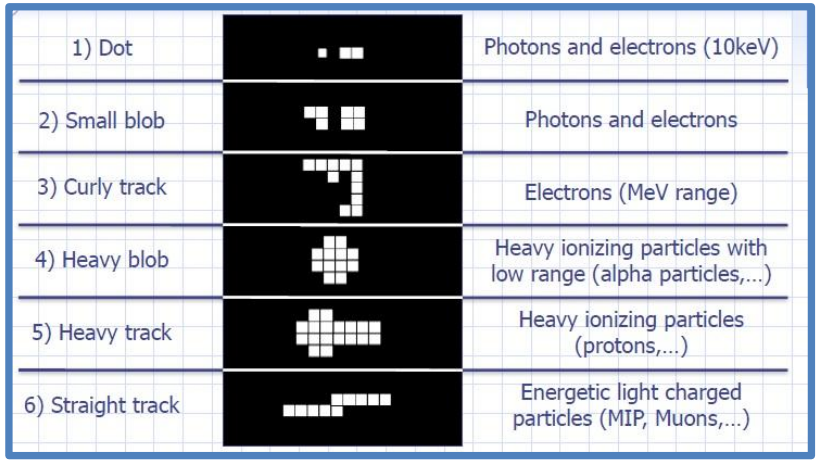
Non-ionizing radiation

- Neutral particles
- Gamma, neutron

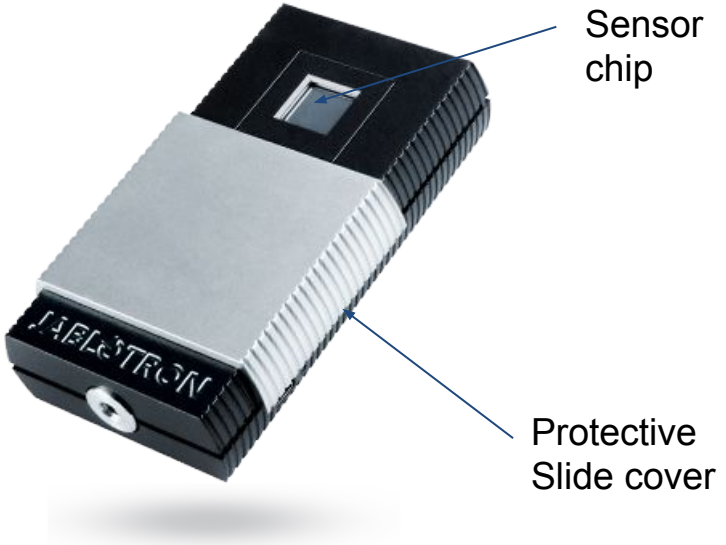
Detection, measurement and control of such particles is important

TimePix Technology





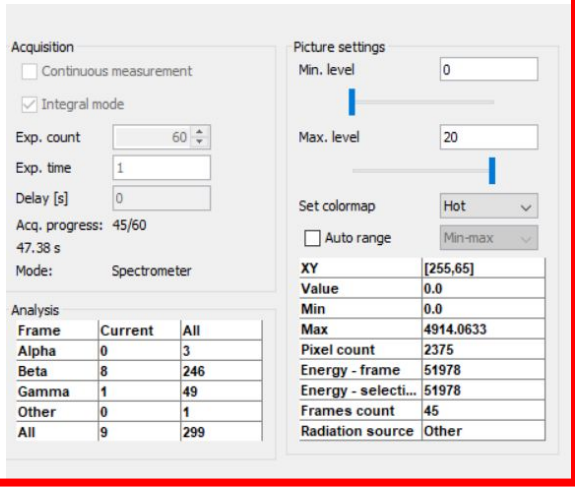
- Digital particle camera
- Real time display
- Display and detect characteristics traces of individual
- Covers a wide range of spectrum
- Uses Pixelman software

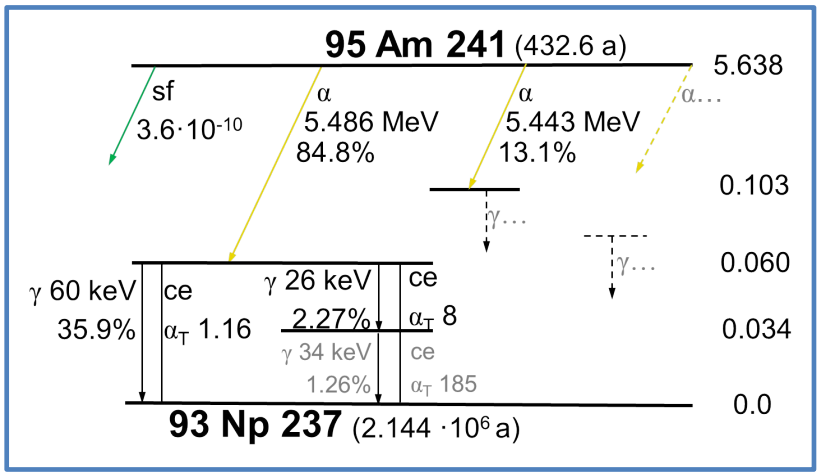


Experimental results:

Objectives: Detection of particles in air and when subjected to aluminium.

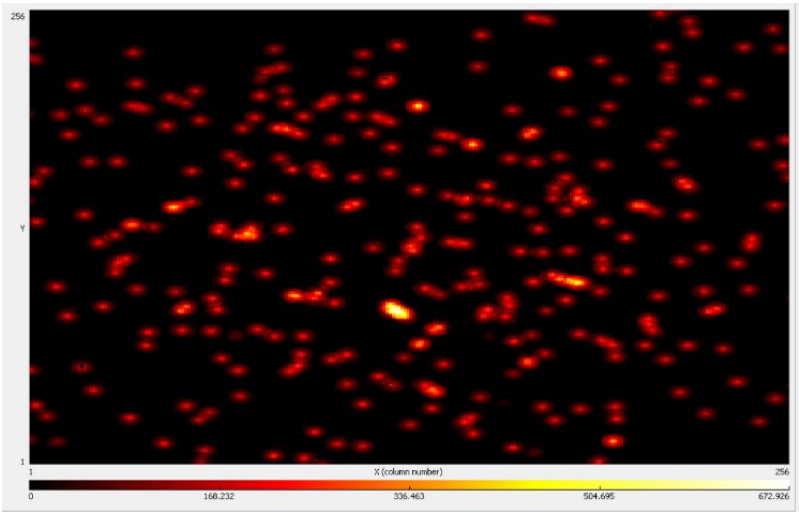
Experimental setup:



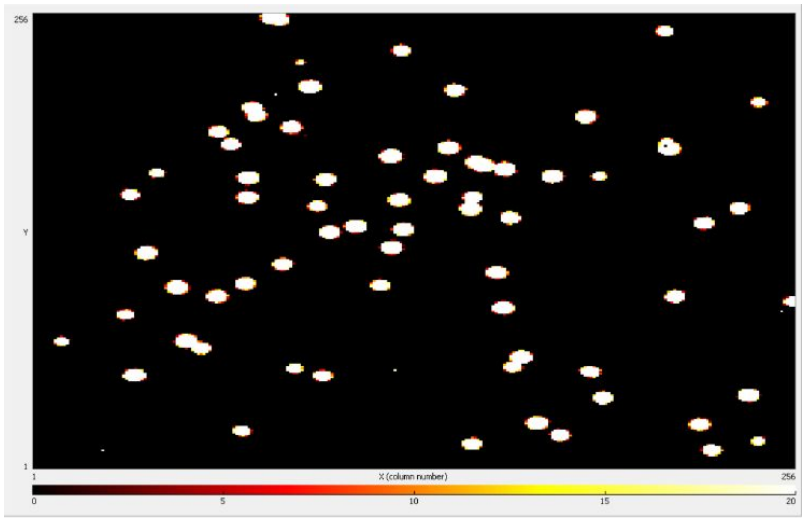


- Americium-241 (9.5kBq)
- Emit alpha particles in the range of 5MeV

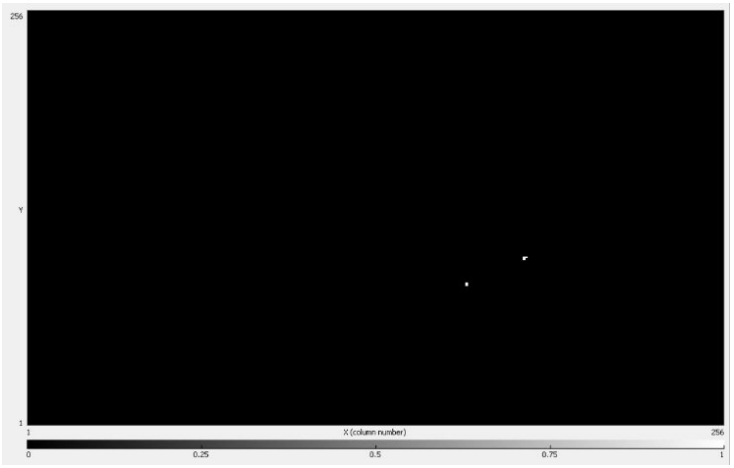
Experimental results cont:



1. Particles from decay of Am-241



2. Particles from decay of Am-241(Auto range unchecked)



3. Particles from decay of Am-241 with Aluminium medium before the detector (1cm)

Conclusion:

- Auto range enables us to select the energy range and hence that determines the type of particles we observe. Lower range we observe beta and gamma rays and higher we observe alpha rays.
- TimePix is a good tool to track radiation particles
- 21st century and beyond requires multidisciplinary knowledge

Acknowledgements

1. https://www.nucleonica.com/Application/ReducedDecaySchemes/Am241_TXT.htm