

DETERMINATION THE RANGE OF ALPHA PARTICLES (Am-241) USING PIXEL DETECTORS

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Pixel Detector

- It is an advanced detector like a digital camera.
- It consists of 3 parts:
1- Sensor (Si) 2- Electronic chip 3- USB
- The size of the sensor is 1.5x1.5 cm.
- It has 256 x 256 pixels (65.536 pixel).
- The pixel size is 55µm x 55µm.
- It has high resolution.
- It is used for registration different types of radiation

Abstract

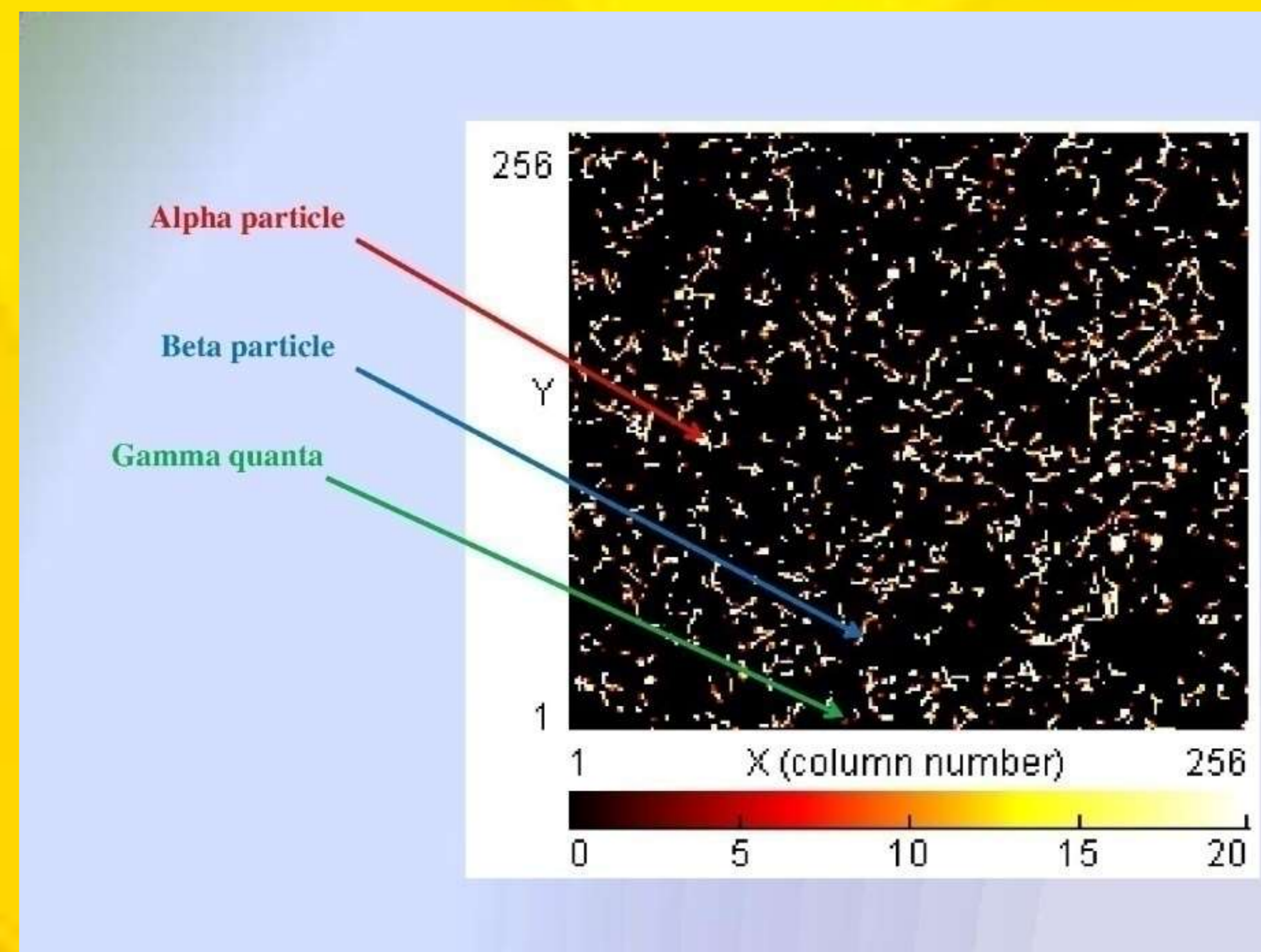
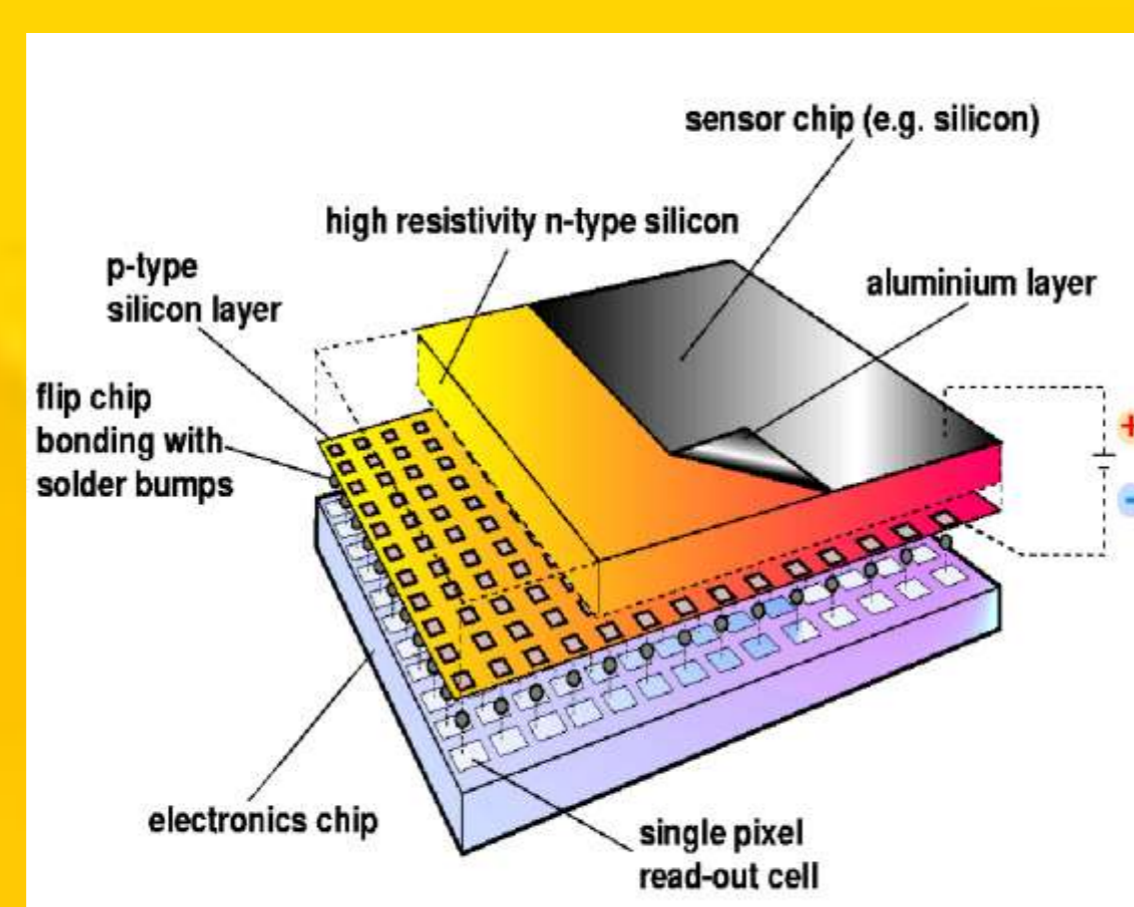
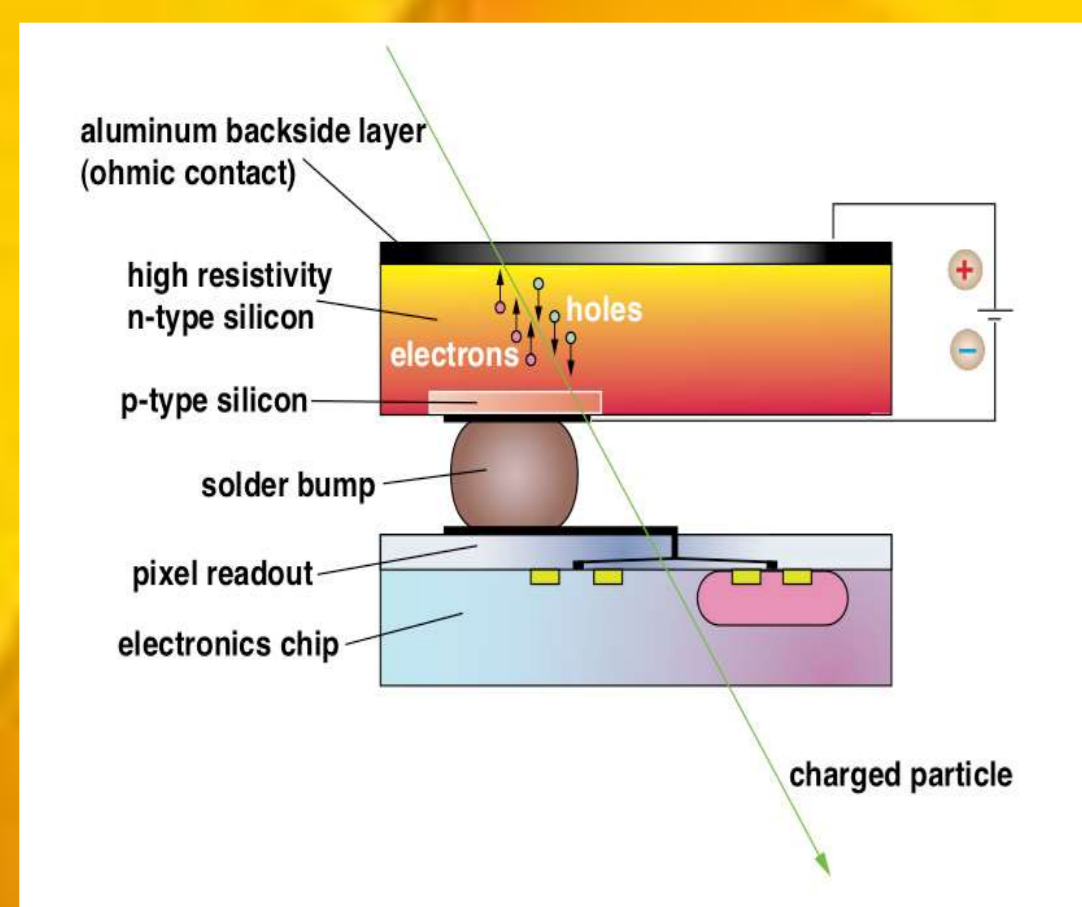
Radiation has a great impact on human life and health, so much attention is paid to new types of detectors. The latest type of pixel detectors work like digital cameras. Due to their high resolution, they are used to detect different types of radiation (X-rays, gamma radiation, neutron radiation, alpha radiation). Radiography and computed tomography (CT) use X-ray photons to study the human body and changes in it. Pixel detector technology has been applied in X-ray CT, in prototype systems for digital mammography, in CT images for mammography and for beta and gamma-ray radiography of biological samples. These instruments are also used for purposes such as the characterization of pharmaceutical products, the evaluation and synthesis of new materials, and the detection of counterfeit drugs. This paper provides an overview of the use of pixel detectors and the estimation of alpha particle range using Monte Carlo SRIM simulation software.

Keywords: radiation, pixel detectors, alfa particle, dosimetry

Medical imaging

Radiography and computed tomography (CT) use X-ray photons to study the human body. The Medipix chips that implement on-pixel single photon counting provide many advantages for use in these fields. The technology has been applied in X-ray CT, in prototype systems for digital mammography, in CT imagers for mammography and for beta- and gamma-autoradiography of biological samples. Moreover, with the Medipix3 chip, the images are no longer black and white - they have colours to indicate different energy levels of the photons. The colour X-ray imaging technique produces clearer and more accurate pictures that should help doctors give their patients more accurate diagnoses.

Hybrid Pixel Detector



Experiment



Determination the range of Alpha particles with (Am-241) energy about 4 MeV in air using pixel detector.

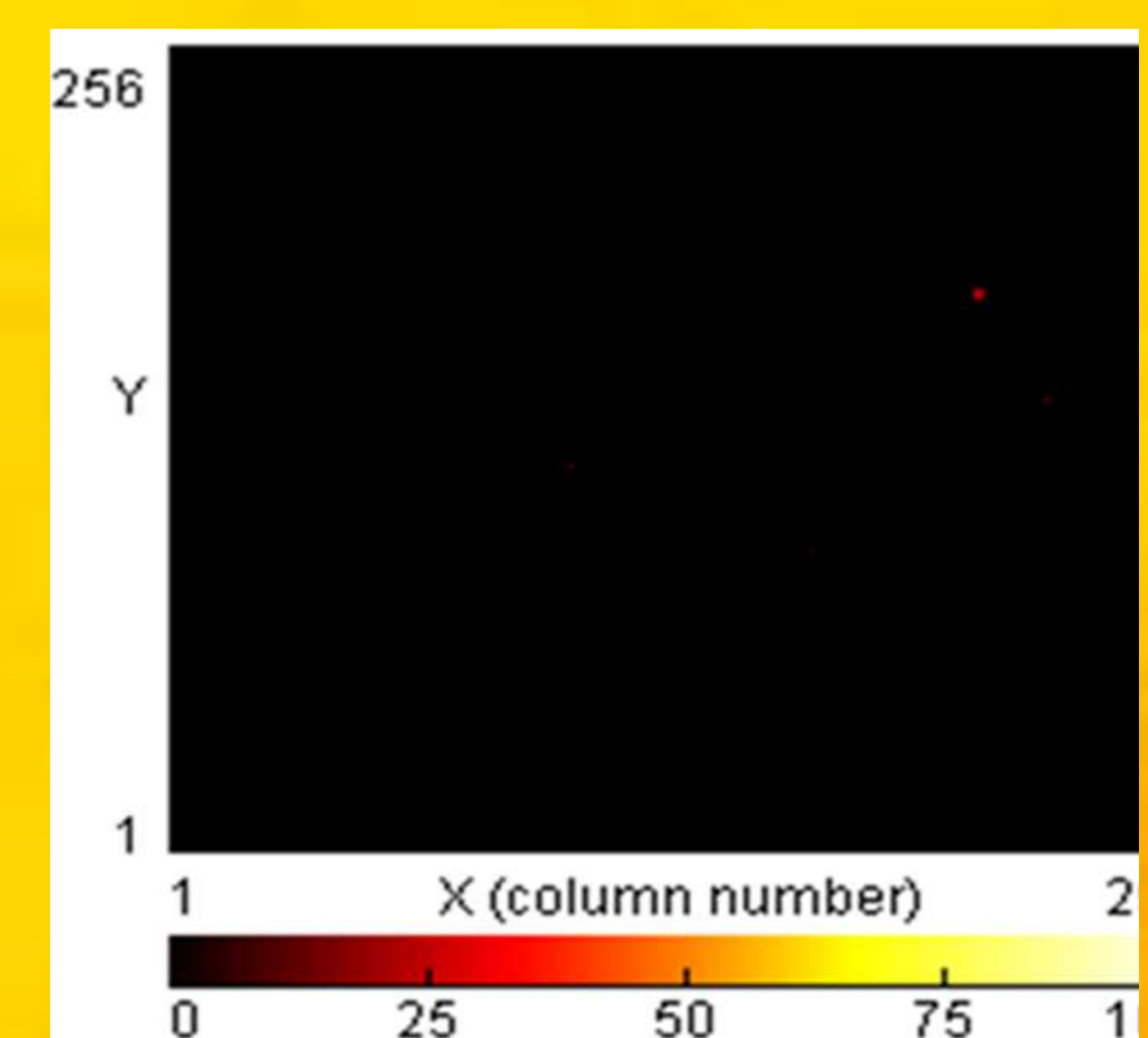
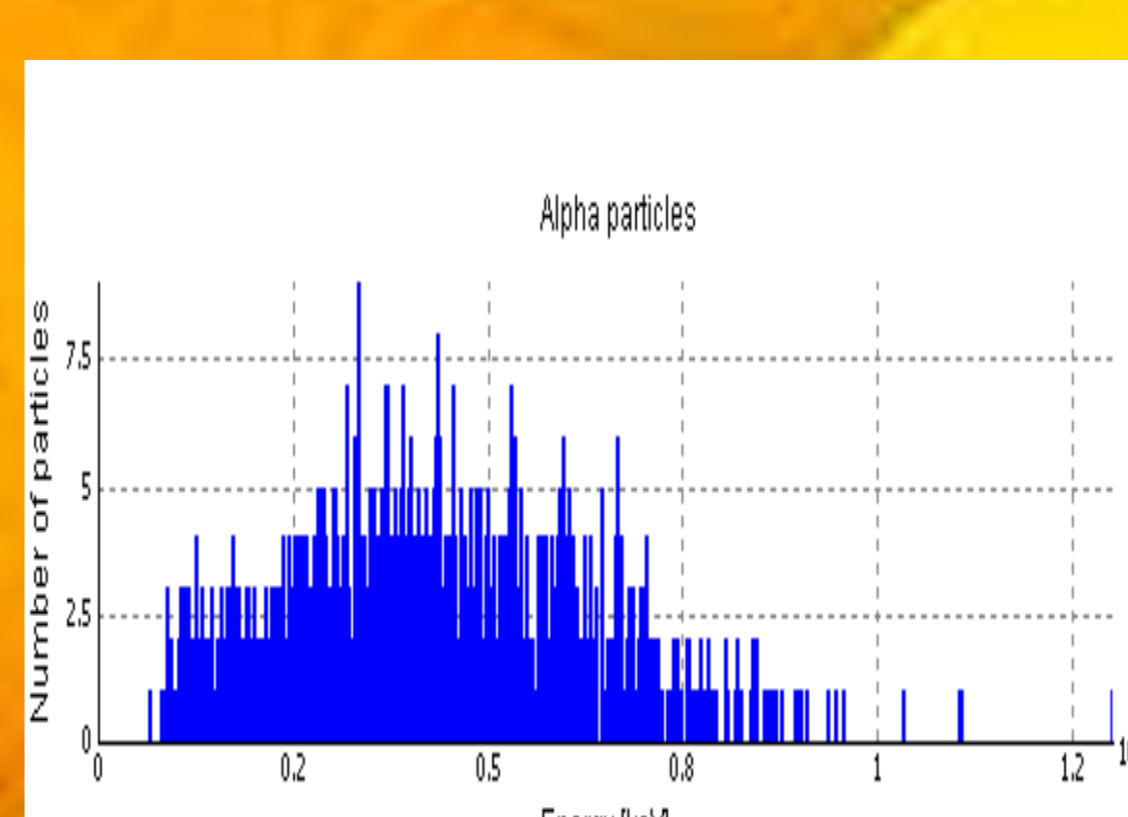
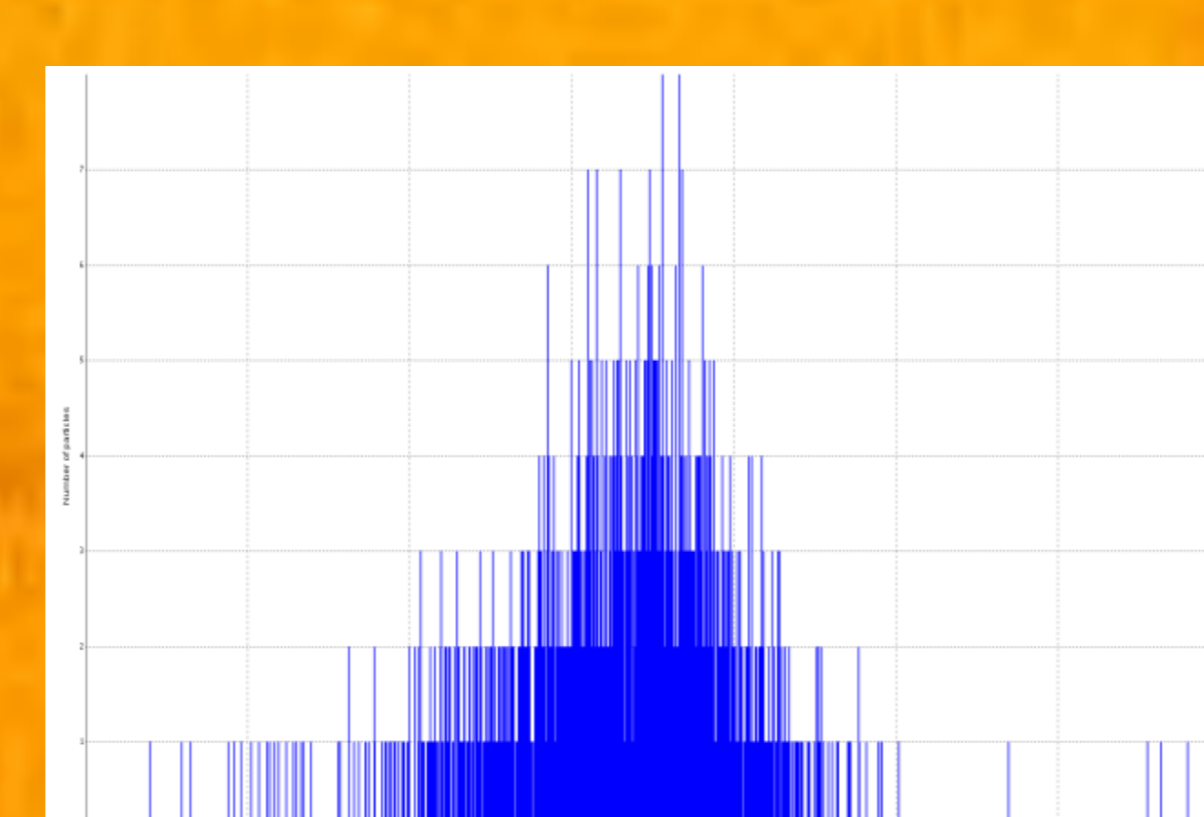
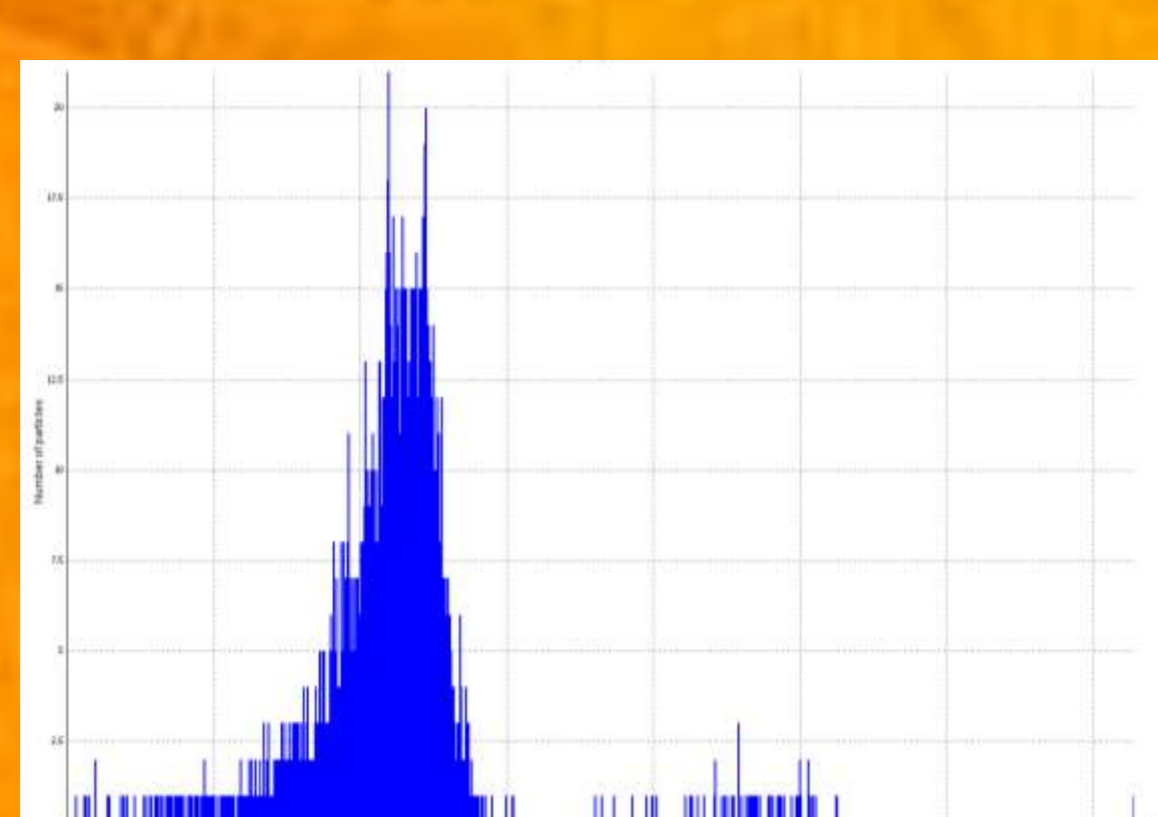
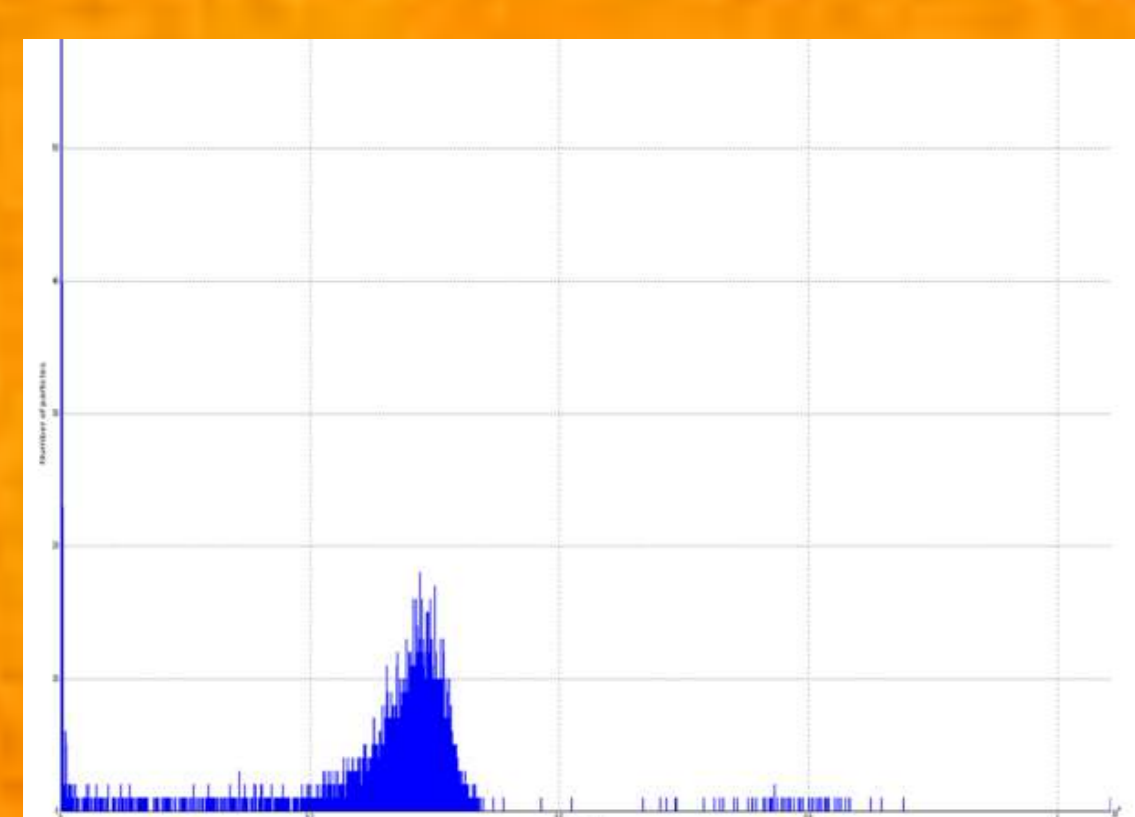
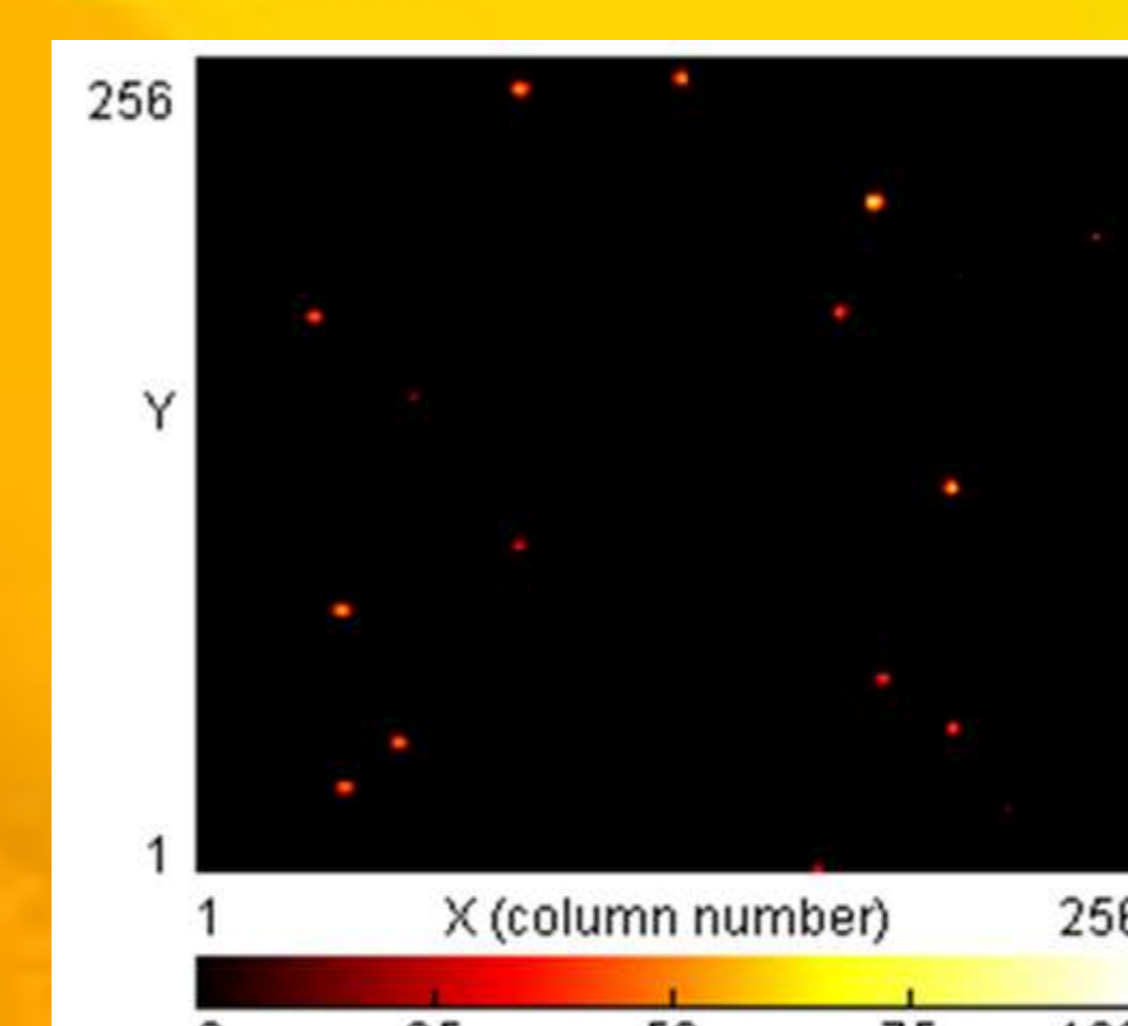
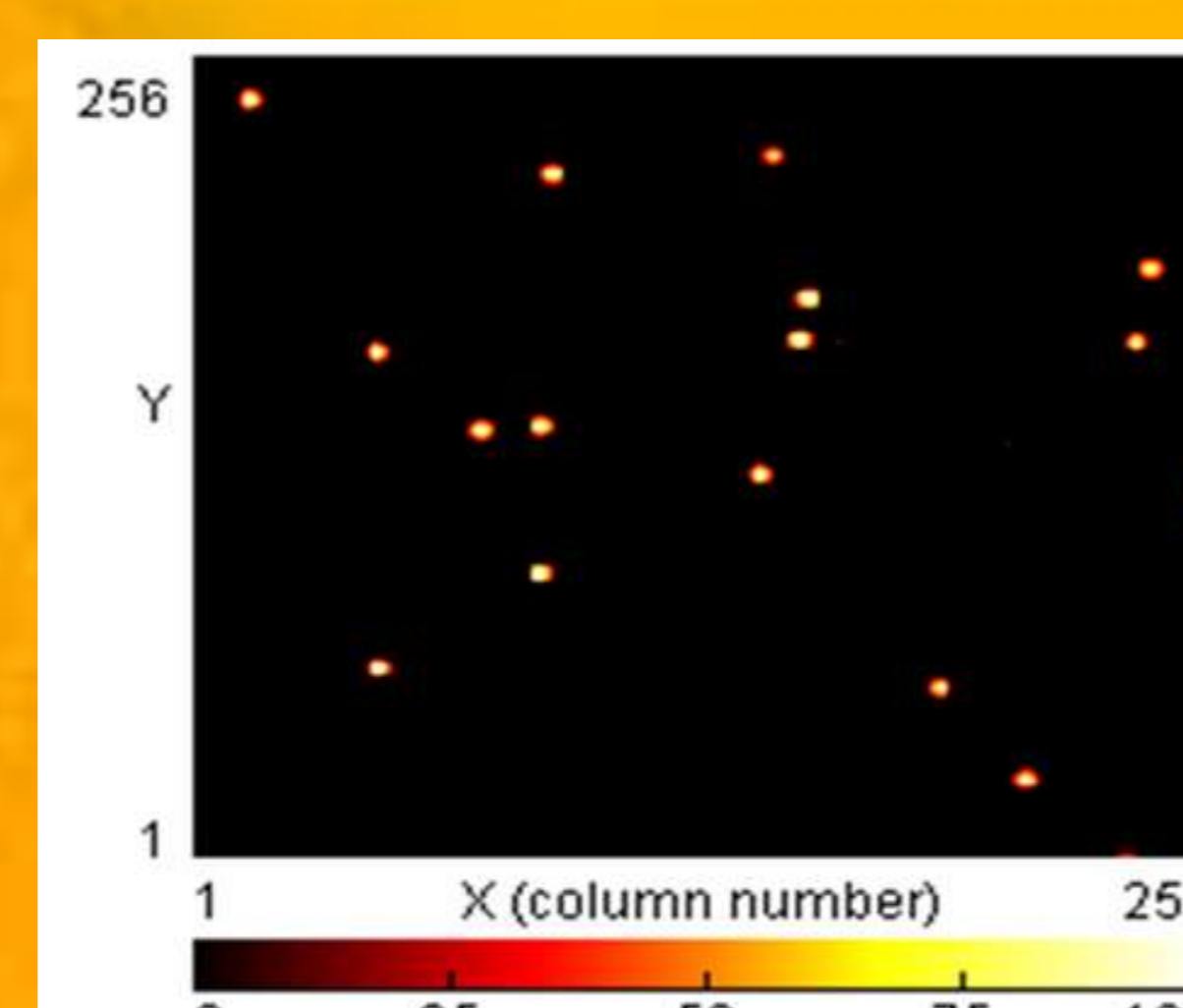
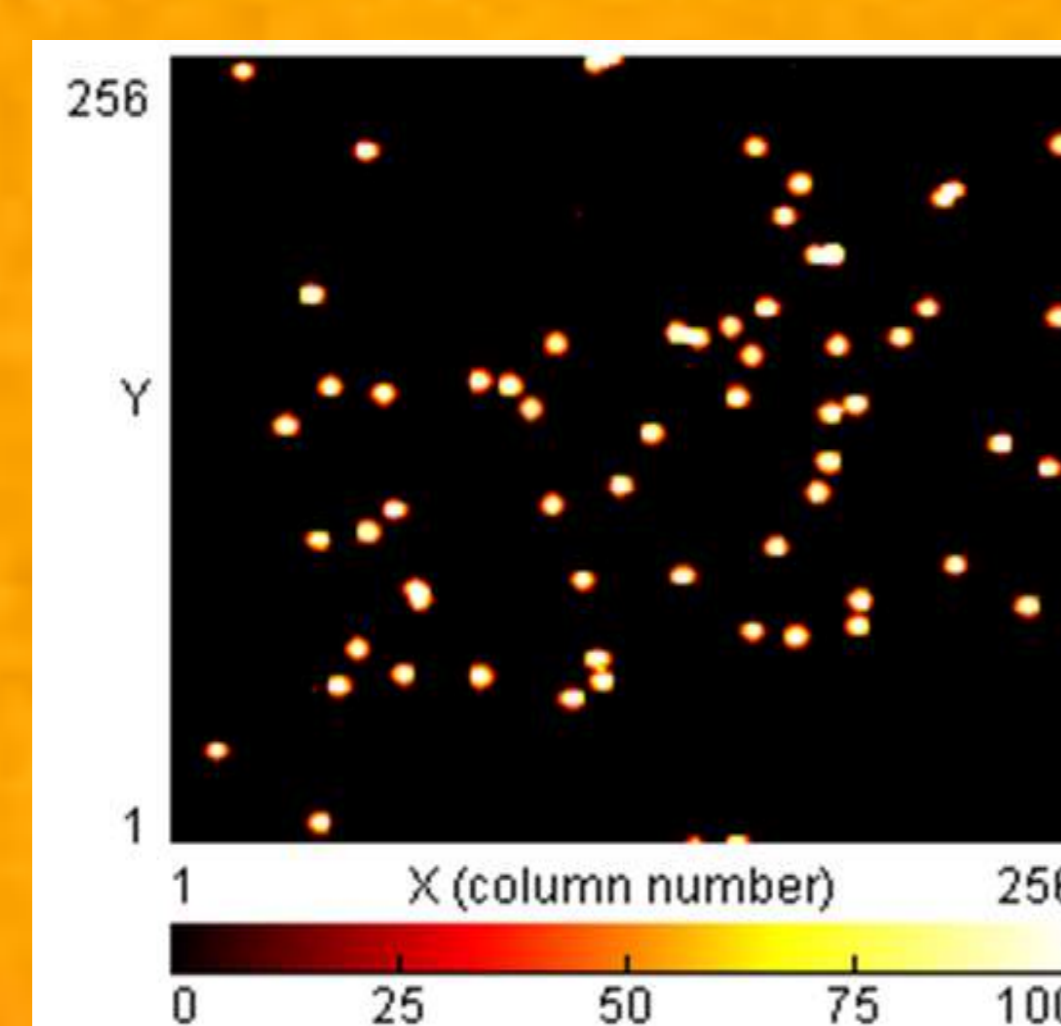
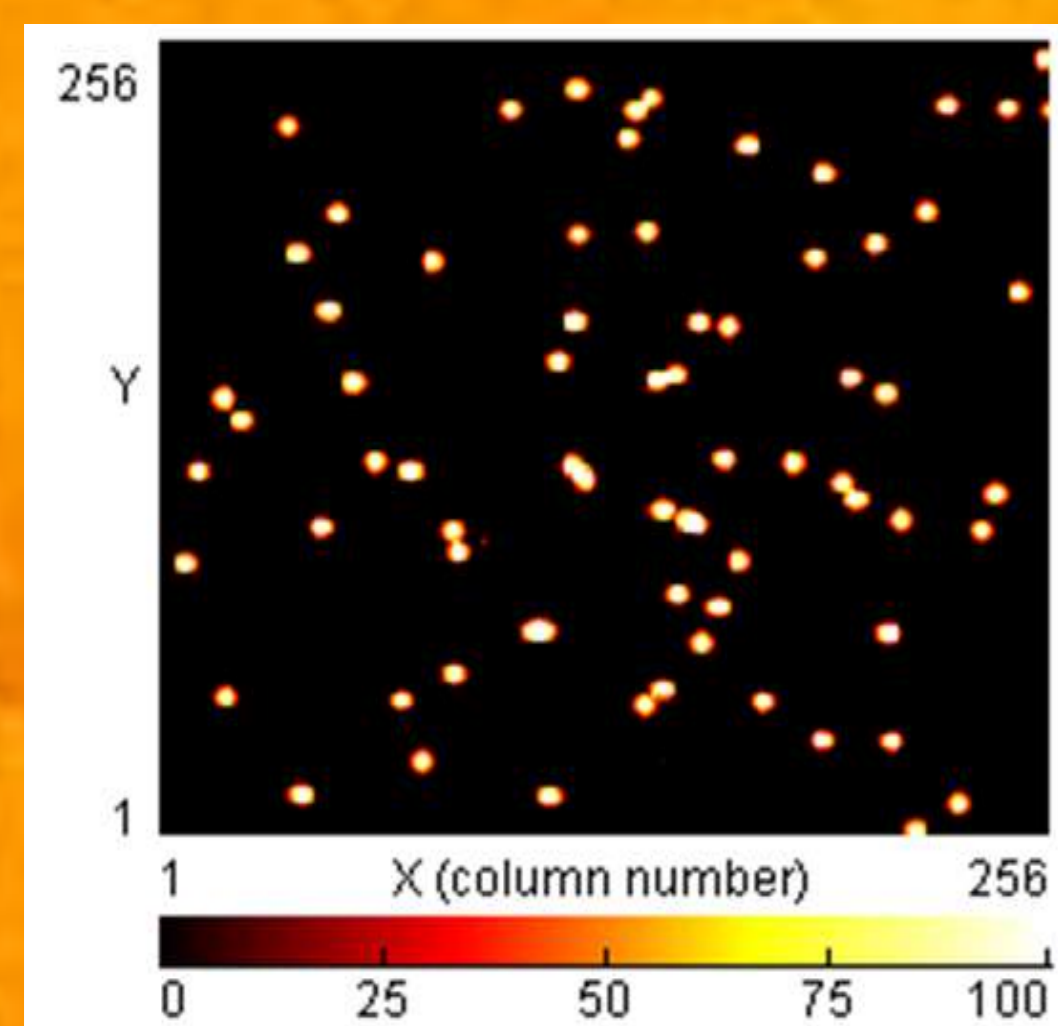
CONDITIONS:

He range in air source : Pu239
Energy of He : 5 MeV
detector: plastic
applied voltage: 2000 V

Conclusion

Maximum of alpha particle range is 3 cm, no alpha particles are detected

Absorption of alpha particle energy in the air at 0, 1, 2, 2.5 cm



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