

## Neutron Detection (ND) Screens – Markets & Applications

Applied Scintillation Technologies (AST) is at the forefront of neutron detection technology by having both the most efficient as well as the largest area scintillators available. This technology, initially developed for the high-energy physics community, is now finding new applications within the medical, security and non-destructive testing markets.



Demands for high performance materials, improved international security, industrial inspection and new medical imaging techniques are all areas in which neutron imaging is being developed to improve analysis techniques.

### Applied Scintillation Technologies solution

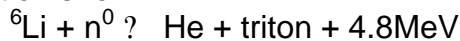
AST's Neutron Detection screens are the scintillator of choice in a multitude of applications as they can be used with both photo-multiplier tube (PMT) and charged coupled devices (CCD) based systems. Available in large area formats our screens provide good resolution and overcome the size, cost and handling difficulties of  $^3\text{He}$  detectors.

Typical applications include:

- ✍ thermal neutron detection in high energy physics
- ✍ neutron radiography in non-destructive testing (NDT) – looking at stress patterns in railway tracks, turbine blades and welds
- ✍ real-time study of hydrocarbon flows – fuel flow inside a jet engine
- ✍ authentication & restoration of paintings – allowing detailed paint layer analysis
- ✍ cancer treatment - neutron radiation therapy of specific tumour types
- ✍ identification of plastic explosives in cross-border and anti-terrorist control
- ✍ crystallography - crystal orientations and phase boundary analysis

## Products

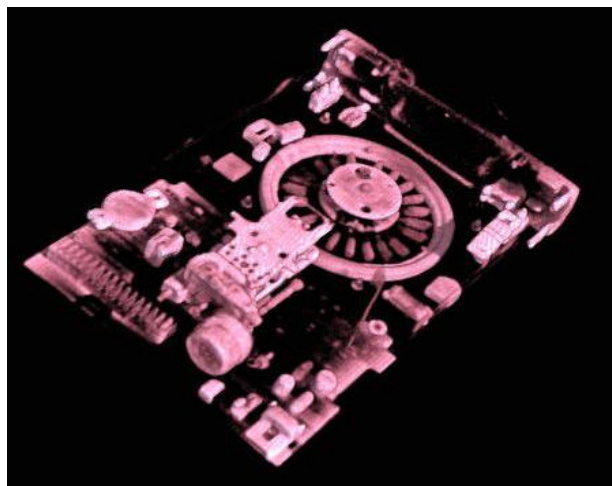
The screens, formed from a blend of  ${}^6\text{Li}$  compounds and phosphors, rely on the  ${}^6\text{Li}$ :thermal neutron interaction shown:



The ejected triton interacts with the phosphor to create a scintillation event that can be detected by a PMT or CCD imaging system.

AST, by carefully assessing the compromises required between absorption, sensitivity and resolution in real applications, have developed two screen formats with features which significantly enhance imaging performance.

The standard **ND blue emitting** screen has unique, low sensitivity to background gamma to improve discrimination, while the **green emitting NDg** is ideal for CCD imaging.



Neutron tomography of a floppy disk drive

Both ND and NDg screen types have higher resolution (6lp/mm or greater) than competitive products and can be custom manufactured in the standard flat sheets or formed into more intricate custom shapes.

## Availability

Small area sample screens are available on request. Both the ND and NDg screens are readily available up to 500mm x 500mm but larger sizes up to 1m x 1m can be manufactured to special order. AST can mount these screens to a variety of backing plates to meet customers' requirements.

Applied Scintillation Technologies has the knowledge and expertise based on years of experience to partner you in the development of custom products for Neutron detection and imaging in NDT & other applications.

Resolution, sensitivity, speed & spectral response are a few of the parameters that can be influenced in the production of a customised product that satisfies your customers' needs.