Arktis Radiation Detectors Ltd
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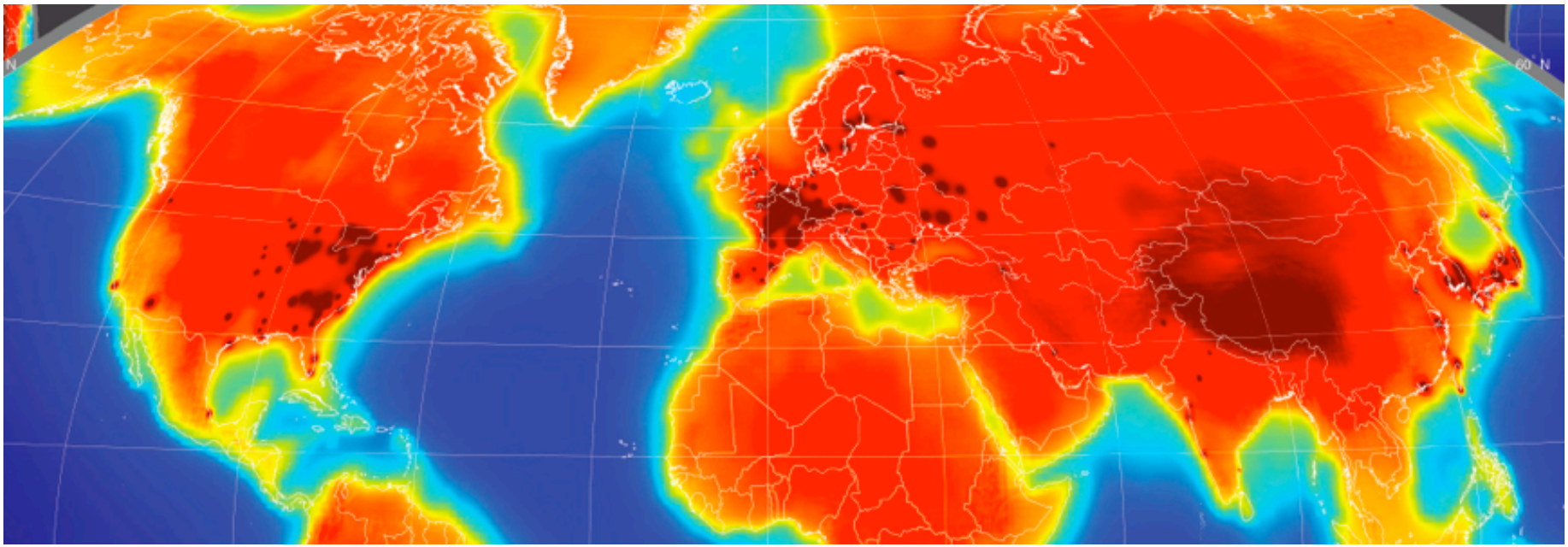
Arktis Radiation Detectors Ltd
Company Presentation

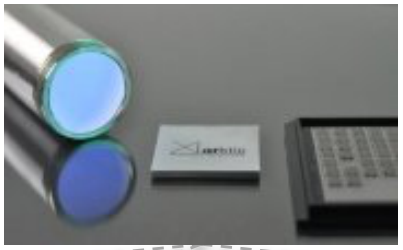


Map of antineutrino radiation produced - amongst others - by nuclear reactors and radioactive materials
https://www.nga.mil/MediaRoom/PressReleases/Pages/Antineutrino.aspx

Company introduction

- Zurich based; US subsidiary
- 25 employees
- In-house production facilities
- Working close together with technical universities and institutes
- Active in the field of:
  - radiation portal monitoring
  - nuclear material assay
  - active interrogation
  - health physics

Products and Markets



Core Technology

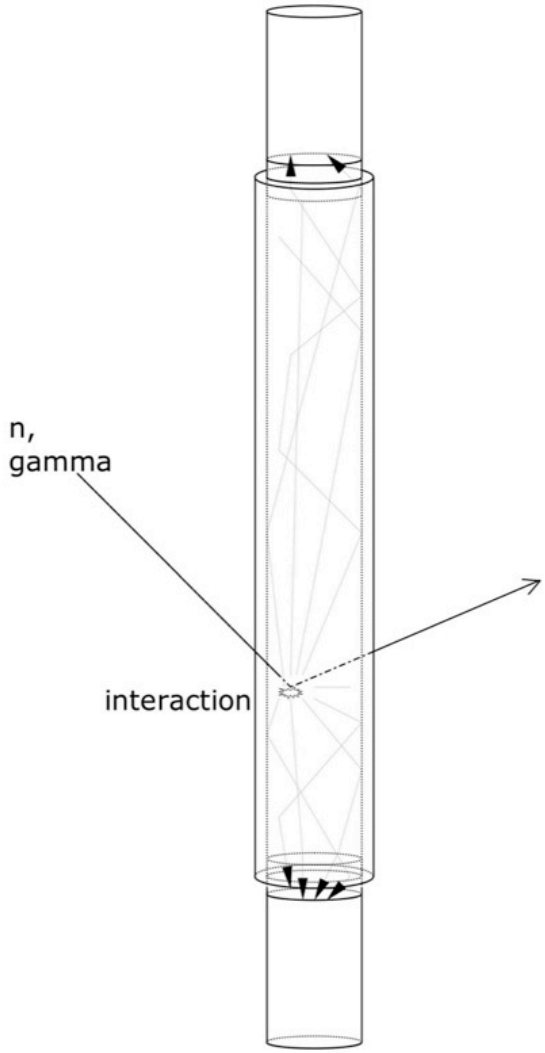
Industry & Manufacturing	Homeland Security & Defense	Nuclear Industry	Research

Noble Gas Scintillation Detectors

Noble gas as a scintillation medium

- Xenon, argon, helium
- High light output (comparable with NaI(Tl))
- Readily available at low cost
- Unlike a crystal, gas does not break or fracture

	Charge (Z)	Photons /MeV	Comments
^{4}He	2	15’000	Low Z -> insensitive to γ (but sensitive to fast neutrons)
^{40}Ar	18	40’000	
^{131}Xe	54	46’000	High Z -> very sensitive to γ
NaI(Tl)	11,53	40’000	Reference scintillator (for comparison)



Neutron Detectors based on Noble Gas Scintillation

- Scalability
- Availability
- Energy and timing information
- Operate in high gamma fields
- Products:
  - Fast neutron detector
  - Combined fast and thermal neutron detectors
  - Thermal neutron detector (direct He-3 replacements)

M1000 Rugged-by-Design™ Neutron Detector

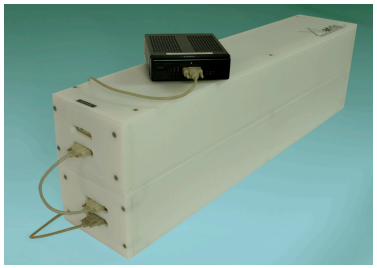
Highly sensitive SiPM-based neutron detectors

Features

- Simple integration into detection systems
- Replaces obsolete He-3-based detection assemblies
- Scalable. Unbeatable price in its performance class
- Immune to shock & vibration, designed for harsh environments

Technology Description

A proprietary, large area Li-6-based coating inside the detector tube captures neutrons, emitting highly energetic charged particles in the process. The energy of the charged particles is converted into light and detected by SiPM light sensors. On board electronics perform digital pulse shape discrimination to reject gamma-induced events and provide a TTL pulse for every detected neutron. Unbeatable robustness is achieved by eliminating fragile components such as crystals, photomultiplier tubes and sensitive anode wires.



Physical Specifications Custom Sizes are available	120 x 23 x 17 cm^3, 29 kg (photo shows two detectors connected)
Neutron Detection Sensitivity	1 cps/ng Cf-252 at 2 m (1 ng Cf-252 emits ~2300 n/s)
	Gamma rejection: 10^{-7} Gamma immunity up to 100 µSv/hr with 0.9 < GARRn* <1.1
	12 V, 3.0 W per detector. Detectors can be daisy-chained, as shown in photo. No high voltage required
	-30°C - 50°C (-22°F - 122°F)
	-50°C - 60°C (-58°F - 140°F)
	0-100% - operable in rain and fog - IP65 compliant version available
	CE

eutron detection gamma ray sensitivity criteria", http://dx.doi.org/10.1016/j.nima.2011.07.030.

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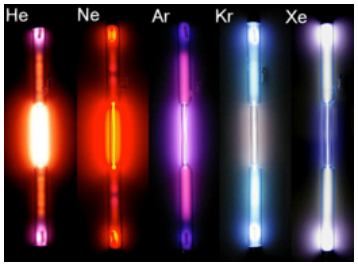
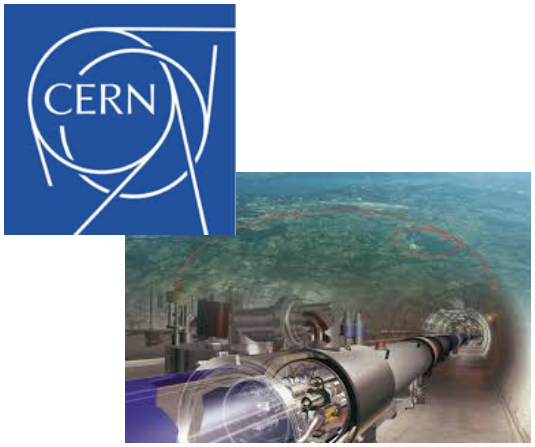
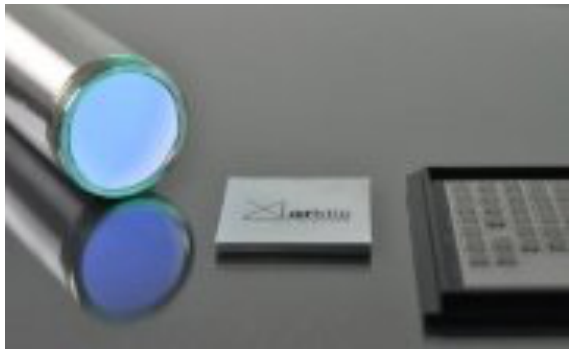
Core Technology Origins



Low cost optical materials:
Noble gas (argon, helium, xenon)

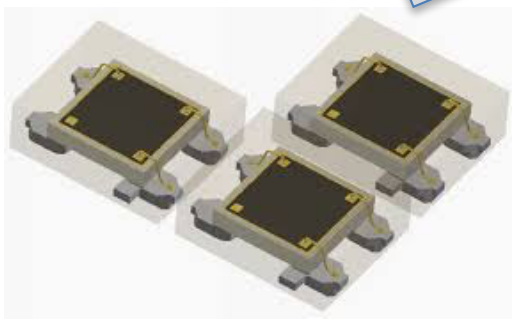


Precursor technology from fundamental physics



> 8 patents

Emergence of affordable solid state light sensors (SiPM)



Emergence of low cost processing & communication

Components: Arktis' Detectors

- Neutron and Gamma Detectors based on Noble Gas
- High performance
- High degree of environmental stability and robustness
- Low cost through usage of readily available materials; economies of scale applies to all parts

Legacy Technology	Arktis	Customer Benefits
Rare materials such as He-3 Toxic materials such as BF3	Readily available and safe materials such as noble gas and steel	Low cost, easy to handle
Fragile parts such as crystals and PMTs	Only unbreakable components such as solid state electronics, gas and steel	Robustness, long life times
Analogue electronic components	Modular digital electronics design	Easy maintenance Automatic calibration Modular and scalable (Adaptation to customer's needs)