

HIGH PURE GERMANIUM DETECTORS



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Partner **BSI**



Baltic Scientific Instruments (BSI) is an OEM manufacturer based in Riga, Latvia, dedicated to the development and production of advanced spectrometric and detection equipment. With decades of experience and roots in the former Research Institute for Radioisotope Apparatus (RNIIRP), BSI provides cutting-edge technologies for nuclear power, environmental monitoring, security, medicine, and scientific research.

The company specializes in HPGe, Si, CdZnTe/CdTe, and scintillation detector systems, known for their accuracy, stability, and performance in demanding analytical environments.

Through continuous innovation, strict quality assurance (ISO 9001:2015), and strong international collaboration, BSI supports customers worldwide in achieving precise and reliable radiation measurement and analysis.

Product offering

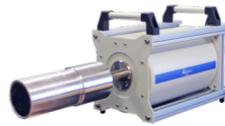
MONOLITH Gamma & X-ray HPGe Spectrometer



HPGe Spectrometer with Lead Shield



Portable HPGe Gamma- & X-ray Spectrometer



Robotic Gamma Spectrometer



HPGe Mobile Spectrometer WAM Mobile



Waste Assay Monitor HERCULES



Ultra Low-background HPGe Detectors





MONOLITH Gamma & X-ray HPGe Spectrometer

Detection unit Monolith consist from the following integrated components:

- HPGe detector
- Preamplifier
- Autonomous cooling system for the detector based on electrical machinery cooler EMC
- Controller for controlling the operation of EMC
- Fans (2-4) for EMC cooling



Features

- 10% - 160% efficiency HPGe p-type coaxial detectors are available;
- Energy range from 40 keV to 10 MeV for GCD model;
- Energy range from 3 keV to 10 MeV for GCDX/GCDX-OS models;
- High efficiency of radiation detection;
- High energy rate up to 200000 MeV/sec;
- Excellent peak symmetry;
- Detection of radiation in any spatial orientation depending on cryostat modification;
- Manufacture in a portable cryostat is possible;
- Low background and Ultra - low background materials are available;
- Doesn't require a full thermal cycle after an unexpected shutdown.



HPGe Spectrometer with Lead Shield

Application

Coaxial HPGe Detector with Lead Shield is used to measure the specific gamma radiation of radionuclides from various types of environmental objects such as rocks, minerals, sludge, slag, soil, plant, sediment and particulate matter in air and water.

Features

- Adopting precision gamma-spectrometry methods
- Radionuclide identification and determination of their specific activity
- Low level of instrumental background
- Low threshold for radionuclide detection
- Separate and simultaneous measurement of activity of 100 radionuclides



DESCRIPTION

Coaxial HPGe Detector with Lead Shield is used to measure the specific gamma radiation of radionuclides from various types of environmental objects such as rocks, minerals, sludge, slag, soil, plant, sediment and particulate matter in air and water.

Ordering information

For LN2 cooled dipstick HPGe detection units:

- N100 - 100mm thick lead.
- N150 - 150mm thick lead.

For electrically cooled HPGe detection units (Monolith):

- M100 - 100mm thick lead.
- M150 - 150mm thick lead.

For hybrid cooled dipstick HPGe detection units (Nicole):

- H100 - 100mm thick lead.
- H150 - 150mm thick lead.

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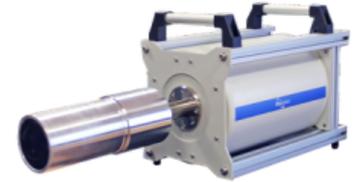


Radiation Detection > High Pure Germanium Detectors

Portable HPGe Gamma- & X-ray Spectrometer

Application

Detection, accumulation, processing and analysis of gamma spectra in field and industry conditions where small dimension and weight of spectrometer are important.



Features

- Ultra-light cryostat fabrication for minimum gamma absorption;
- Light weight aluminum construction;
- Detection of radiation in any spatial orientation;
- Compact low consuming electronics;
- Available with HPGe coaxial or planar detector;
- Transportation and storage without cooling.

Detection, accumulation, processing and analysis of gamma spectra in field and industry conditions where small dimension and weight of spectrometer are important.

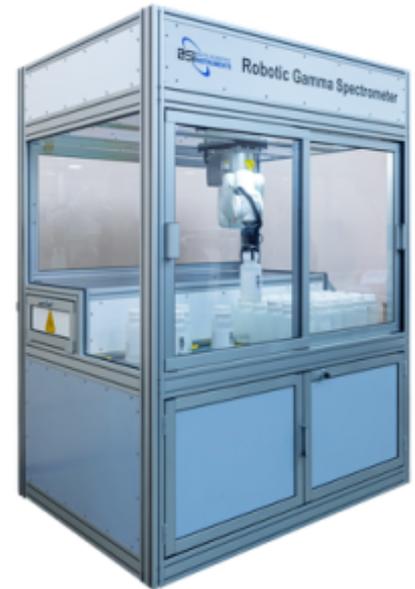


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Robotic Gamma Spectrometer

Application

The Automated Spectrometer is intended for the detection and analysis of radio nuclides from various types of environmental objects such as rocks, minerals, sludge, slag, soil, plant, sediment and particulate matter in air and water. The spectrometric system is able to determine the composition of a sample based on the photon energy and the activity based on the photon flux. The low-background lead shielding together with the highly pure germanium (HPGe) p-type detector gives precise results even for low activity materials. The fully automated sample changer enables the user to measure more than 40 samples, without having to interact with the Robotic Gamma Spectrometer. This reliable robotic sample changer increases the productivity and reduces the possibility of health risks for the operator.



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The fully automated sample changer enables the user to measure more than 40 samples, without having to interact with the Robotic Gamma Spectrometer. This reliable robotic sample changer increases the productivity and reduces the possibility of health risks for the operator.

Automatic Sample Changer

The seven-axis robot handles a payload of up to 3kg and with, practically, unlimited reach, the robot is able to carry out a series of operations using flexible rather than hard automated solutions. In addition to a horizontal reach, the robot has the ability to reach below its base. Furthermore, the robot has a very compact turning radius, which is enabled by the robots symmetric architecture, without offset on axis 2. This ensures the robot can be mounted close to other equipment.

Basic characteristics of Robot arm:

- Seven-axis manipulator
- Machine vision
- Payload: 3 kg
- Reach: per request
- Fastest 7-axis robot
- Accuracy: ± 0.01 mm
- Weight: 25 kg
- IP30 protected

- All motors and cablings enclosed
- Compact controller
- Sample holder tool for vessels with diameter in range 40 - 110 mm.
- Barcode Reader and Writer

To assure the correct processing of all data during the measurement and analysis process, the samples are marked by using a barcode printer that is connected to the workstation. Here all necessary information about the sample is stored in a database. Using the bar code reader, the information stored in the database is retrieved for each sample before the measurement process is started. This fully automated process delivers all necessary information for the measurement and analysis process.



HPGe Mobile Spectrometer WAM Mobile

Application

Registration of gamma and X-Ray spectra for applications including: radiological monitoring of the environment; industrial and agricultural products; nuclear power facilities and equipment; and with the storage and processing of radioactive waste.



Features

- Optimal sizes and weight for mobile application
- Detection unit is placed on a manually or electrically driven trolley
- Trolley is equipped with a lead shield and collimator set
- Lead shield thickness can be 25mm or 50mm depending on the application
- Detection unit can be LN2 or electrically cooled
- Possible to equip with large capacity batteries for autonomous operation in the field even with electrically cooled detection unit
- Equipped with laser distance meter for more accurate measurement
- Complete spectrometer can be characterized at factory
- Simplicity of operation and servicing

Registration of Gamma and X-Ray spectra for the radiological control of environmental objects, industrial and agricultural products, objects and plants of nuclear energetics and enterprises dealing with the storage and processing of radioactive wastes.

Advanced software package allows to calibrate the system for complex geometry samples like different size drums, boxes, metal or concrete containers, etc. User has a choice of more than 20 ready geometries or it is possible to create your own. While performing characterization, different collimators can be considered, shielding and orientation of all objects involved. Monte-Carlo calculations are used.



Waste Assay Monitor HERCULES

Application

The WAM measuring system is intended for the measurement and the determination of nuclear waste activities, activity concentrations, total activities and total activity concentrations of the selected radionuclides which emit gamma radiation in a range from 100 to 1500 keV. Total activities are the sum of activities of individual radionuclides; and total activity concentrations are the sum of all activity concentrations of individual radionuclides. Solids and materials with an average density up to 2500 kg/m³ located in the standard drums with a volume of about 0.2 m³ are measured.



Features

The WAM (Waste Assay Monitor) is a complex measuring system which is intended for the monitoring of radioactive waste in standard 200-litre drums. WAM involves the following systems:

- Monitor – a fixed segmented gamma-spectrometric monitor for the determination of activities of selected radionuclides in the individual drum segments with vertical motion and collimator
- Transfer system is used for moving the measuring part from/to the drum measured
- Dose rate monitor, direction-dependent, measures the dose rate of the segment in the defined distance from the drum
- Dose rate monitor measures the background dose rate
- Rotary table, control and power supply switchboards

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Ultra Low-background HPGe Detectors

Application

Ultra low-background HPGe detectors are widely used in underground laboratories for determination of radionuclides activities in environmental or industrial samples at $\mu\text{Bq/kg}$ levels and in scientific experiments such as investigation of magnetic moment of neutrino, dark matter search, etc.



Design

- Task related design (U-type, vertical, down-looking or portable cryostat)
- Remote not cooled part of preamplifier
- Zeolite is placed near not cooled part of preamplifier in order to be outside measuring chamber

Cryostat materials

- Certified materials with low radiation impurities
- Ultrapure aluminium-silicon alloy with U + Th content < 1, 0.5 or 0.2 ppb for detector holder and endcap
- Freshly produced electrolytic copper for coldfinger and pedestal
- Tested on radiopurity selected stainless steel screws and sapphire insulators

Technology

- Transportation of HPGe crystal and cryostat materials by surface freight
- Minimization of fabrication time (location of materials above ground)
- Assembly in a cleanroom
- Cleaning and passivation of copper surfaces
- Storage of crystal and cryostat materials in a container made from materials effectively slowing down and absorbing neutrons (water and Cd)

Design features

- Fabrication of large volume HPGe detectors without bulletization
- Front end electronics made on low-background Teflon substrate
- Passive screen between front end electronics and HPGe crystal made from Pb with Bi-210 radioactivity < 0.1 Bq/kg
- Double-crystal HPGe detector design
- Multi-crystal HPGe detector design



Partner **PHDS**



PHDS Co. specializes in the development of portable High-Purity Germanium (HPGe) gamma-ray detectors, providing high-resolution spectroscopy and imaging capabilities for applications in nuclear security, emergency response, and scientific research. Their instruments are designed to offer precise isotope identification and quantification in field-deployable formats.

Product offering

GeGI: Imaging HPGe Detector



NP Radiochemistry Imager



Fulcrum: HPGe Detector



Fulcrum-40h: 40% HPGe Detector



LoPro HPGe Detector



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GeGI: Imaging HPGe Detector

- HPGe gamma-ray spectroscopy and isotope identification
- Real-time exposure rate calculation
- Fully capable of imaging Special Nuclear Materials (^{235}U and ^{239}Pu)
- Fast cool-down to operating temperature
- Long-life mechanical cooler
- Compact and hand-portable
- Hot-swappable batteries for continuous field operation
- User-friendly tablet operation
- Reachback File: ANSI N42.42 format





Radiation Detection > High Pure Germanium Detectors NP Radiochemistry Imager

The NP Imager is specifically designed to measure the dynamics of radiochemical separation processes in real time. Developed under a Small Business Innovation Research (SBIR) grant from the Department of Energy Office of Nuclear Physics (NP), the NP Imager focuses on the unique needs of radiochemists and technicians separating radioisotopes for radio-pharmaceuticals and other applications.



The NP Imager monitors the locations and distributions of multiple isotopes over time, allowing the radiochemist and technician to monitor separation processes in real time. In the process shown here, NP Imager measured Lu-177 and Yb-175 separation on a column over the course of 3 ½ hours using 10-minute exposures. Note that it's clear when the Yb-175 has been removed from the column, allowing the radiochemist to know when to collect the desired Lu-177.

Applications

- Radiopharmaceutical Process Monitoring
- Radiochemical Separation Research and Development
- Nuclear Physics Isotope Production
- Nuclear Materials Management
- Waste Management
- Decontamination and Decommissioning



Fulcrum: HPGe Detector



Overview:

The Fulcrum is a next-generation HPGe gamma ray detector engineered for rapid, accurate isotope identification in a compact, field-ready design. Weighing just 8 lbs, it is the lightest and most portable detector of its kind, making it ideal for mobile and emergency response scenarios. Equipped with the user-friendly PHDS OMNI software, the Fulcrum offers real-time exposure rate calculation and intuitive, color-coded isotope identification—all accessible through a simple touchscreen interface. With fast cool-down, wireless capability, and extended field operation features, the Fulcrum sets a new standard for high-performance gamma spectroscopy in any environment.

Features:

- HPGe gamma-ray spectroscopy and isotope identification
- Ultra-fast cool-down to operating temperature (2 hours)
- Most compact and lightweight HPGe detector (8 lbs)
- Relative efficiency: 12% at 1333 keV
- Real-time exposure rate calculation
- Compact, hand-portable design
- User-friendly Android app interface
- Wireless capability for remote operation
- Long-life mechanical cooler
- Bridge battery option for uninterrupted field use
- User-defined timed data acquisition with auto file save
- Reachback file output in ANSI N42.42 format



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Radiation Detection > High Pure Germanium Detectors **Fulcrum-40h: 40% HPGe Detector**

- HPGe gamma-ray spectroscopy and isotope identification
- Relative efficiency of 40% (at 1332 keV)
- Fast cool-down to operating temperature (5 hours)
- Long-life mechanical cooler
- ISOTAC activity calculator
- Configurable with 1 or 2 onboard batteries and optional neutron detector
- Real-time exposure rate calculation
- User-specified timed data acquisition and auto file save
- Reachback File: ANSI N42.42 format





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LoPro HPGe Detector

The LoPro is a lightweight, low-profile HPGe gamma ray detector used by U.S. military operators around the world. The LoPro provides unmatched field reliability and gamma-ray spectroscopy for mission-critical applications. The unique form factor allows inconspicuous measurements for missions in which discretion is a must, while not sacrificing the spectroscopic performance expected from an HPGe detector.

Features

HPGe gamma-ray spectroscopy and isotope identification	Fast cool-down to operating temperature (3 hours)	Compact and hand-portable (8 lbs)
Integrated GADRAS isotope identification	Relative efficiency: 12% (at 1333 keV)	Real-time exposure rate calculation
User-friendly Android app, including TAK compatibility	Reachback File: ANSI N42.42 format	Long-life mechanical cooler
Long battery life (up to 15 hours per battery)	Wireless capable for remote operation	User-specified timed data acquisition and auto file save





Partner **Other**

Product offering

**Prompt Gamma
Neutron Activation
Analysis (PGNAA)
Spectrometer**





Prompt Gamma Neutron Activation Analysis (PGNAA) Spectrometer

Unlock the future of material analysis with our state-of-the-art Prompt Gamma Neutron Activation Analysis (PGNAA) Spectrometer. Designed for precision and efficiency, our PGNAA spectrometer is the ultimate solution for industries requiring rapid and accurate elemental analysis of bulk materials. Ideal for mining, cement production, environmental monitoring, and recycling, it provides unparalleled analytical capabilities.

Our PGNAA spectrometer delivers real-time, non-destructive analysis of elements within a sample, allowing immediate feedback and decision-making. It detects a wide range of elements, including trace elements, with exceptional accuracy, ensuring compliance with industry standards.

What sets our PGNAA spectrometer apart is its robust design and user-friendly interface, integrating seamlessly into your workflow for maximum efficiency. The advanced software provides intuitive data interpretation, enabling even non-expert users to operate it easily.



Application

PGNAA Spectrometer is intended for:

- Analysis of the radionuclide composition of samples containing trace amounts of radionuclides;
- Search for decay products of radionuclides of anthropogenic or natural origin;
- High registration efficiencies and low detection limits are achieved with;
- Reduction of natural background levels through the use of materials purified from radionuclides;
- Increase in peak contrast due to active suppression of Compton scattering quanta.

PGNAA Spectrometer is applicable in:

- Mining and Mineral Exploration: For accurate and rapid elemental analysis of ores and minerals.
- Environmental Monitoring: Detecting and quantifying pollutants in soil and water.
- Agriculture: Analyzing soil composition to optimize fertilizer use and crop yields.
- Petrochemical Industry: Monitoring elemental composition in crude oil and its derivatives.
- Geological Research: Studying rock and sediment samples for scientific research.
- Pharmaceutical Industry: Ensuring the purity and composition of raw materials and finished products.
- Academic and Research Institutions: Conducting advanced research in various scientific fields.