MIRION TECHNOLOGIES

Segmented Planar Germanium EGPS series

Detectors for X and γ Ray Measurements

EGPS series is the best choice for X or gamma ray measurements in many applications such as Physics or Astrophysics experiments.

100 pixel detector in a vertical cryostat design

FEATURES

- For high performance X and g measurements in Physics, astrophysics, non-destructive control and medicine
- Unique proprietary segmentation techniques developed and enhanced for over 15 years
- Large range of shapes (pixels, strips) and segmentations (straight strips, circular, single or double sided)
- Excellent energy resolution (<130 eV at 5.9 keV, depending on geometries and count rate)
- Excellent performance at high count rates, with small as well as large detectors (up to 1 Mcps)
- Accurate localization of the interaction points (1, 2 or 3D)
- Thickness up to 20 mm
- Crosstalk with physical pulses 1% maximum
- Double sided segmentation capability, using Mirion thin window proprietary technology
- Available with LN_2 or electrical cooling

DESCRIPTION

Mirion series EGPS detectors are manufactured using a proprietary technology allowing design for the best strip germanium detectors available worldwide. Mirion uses photolithography techniques – usually employed in microelectronics – to germanium diodes. Thus, all kinds of segmentation patterns are possible (straight or curved strips, pixels, etc.) including double sided thin window segmentation. This reliable technology has been proven since the eighties

Segmentation offers many benefits:

- Suppression of dead layers between consecutive strips.
- Thinnest pitch: down to 50 µm on single sided strips.
- Excellent performances at high count rates (up to 1 million pulses per second).
- 2-sided photolithography capability, with pitchs up to 200 µm.
- Excellent FWHM resolution: typically <130 eV at 5.9 keV.
- No measurable physical crosstalk.

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APPLICATIONS

- Synchrotron (EXAFS, diffraction, medical beam lines)
- Nuclear Physics (tracking)
- Compton cameras (imaging)
- Non destructive control
- Radiography
- Medical (BNCT, Angiography)

The segmentation techniques fit with all crystal designs: circular, rectangular, etc. Diodes which are segmented by photolithography allow easier and more accurate 3D localization of interaction points than those obtained with segmented coaxial detectors. This is due to the electrical field characteristics within the detector. Several EGPS detectors may be associated in arrays or may be stacked in a single cryostat, thus offering smaller dead layers to increase of the angular covering (or high energy ray absorption depending on system configuration).

Various similar assemblies of that kind are used for Compton Cameras. EGPS detectors are cooled at liquid nitrogen temperature and may withstand many thermal cycles without any performance degradation. Such characteristics make Mirion EGPS series the best choice for X or gamma ray measurements in many applications such as Physics or Astrophysics experiments as well as non invasive detection or medical application.

SPECIFICATIONS

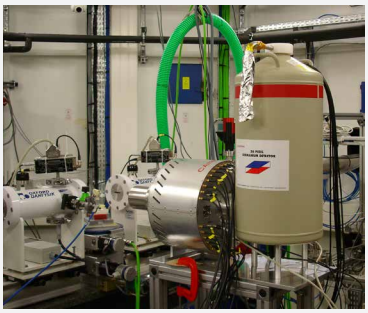
Linear Germanium Arrays

- Number of elements: up to 1024. Single or double sided
- Any pitch from 50 µm+ for single sided
- Active strip length: any dimension compatible with 4 inch wafers
- Detector thickness: up to 20 mm
- Energy range: 1 keV to several MeVs

Pixellated Germanium Detectors

- Typical array size: up to 60 mm x 60 mm active area, more available upon request
- Pixel size: from 50 µm to 8 mm. Customized upon request depending on application
- Detector thickness: from 750 µm up to 20 mm
- Typical energy range: 1 keV – 200 keV
- Energy resolution: 130 eV – 250 eV depending on pixel size, count rate, electronics, mechanical setup
- Cryostat: large cryostat choice and customization to best fit customer's constraints
- Cooling: LN_2 or electrical cooling

100 pixel detector in a vertical cryostat design



36 pixel detector for EXAFS at Soleil Synchrotron

Courtesy of Dr Emiliano FONDA – Soleil Synchrotron – SACLAY France

25 pixel for EXAFS at Spring8

Courtesy of Dr Uruga JASRI

64 pixel detector in a horizontal cryostat design

36 pixel for gamma applications (BNCT, precise neutron section measurements to better understand (n,xn) reactions)

13X-13Y strip detector for tracking with electrical cooler Cryo-Pulse® 5 cryostat

Two Telescopes with each two DSSDs –for the "GREI" project

Courtesy of Dr Shinji Motomura – RIKEN CMIS Japan

Telescope of two DSSD for Compton camera

STRIP GERMANIUM DETECTOR for medical beamline at ESRF France – 864 strips – 350 µ pitch – Long. = 150 mm – Width = 20 mm – Thick. = 2 mm – FWHM = 1.3 keV at 60 keV (angiography)

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