



**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY**  
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## Technical Specifications for CZT X-ray / gamma-ray detector

### Overall Features

- Complete package, including ASIC to obtain digital output
- Crystal composition approximately  $\text{Cd}_{0.9}\text{Zn}_{0.1}\text{Te}$
- Ohmic contacts between CZT crystal and ASIC
- Low-power ( $< 0.5\text{ W}$ )
- Supported high voltage range:  $-400$  to  $-800\text{ V}$ .
- Minimal connections: power, HV, data

### Energy specifications

- Lower energy limit:  $\leq 20\text{ keV}$
- Higher energy limit:  $\geq 200\text{ keV}$  required, option for higher energies preferred
- Energy resolution: FWHM  $\leq 6.5\%$  at  $122\text{ keV}$  (Co-57 line),  $\leq 12\%$  at  $60\text{ keV}$  (Am-241 line)
- Photo-peak efficiency  $\geq 40\%$

### Pixel properties and geometry

- Pixel size:  $2\text{--}3\text{ mm}$
- Number of pixels:  $\geq 256$  arranged in a square array
- Number of malfunctioning pixels (dead or noisy)  $\leq 10$
- Thickness: approx.  $5\text{ mm}$

### Operational requirements

- Maximum count rate:  $\geq 1000\text{ counts/sec}$ , with  $\leq 10\%$  loss due to dead time
- Operating temperature: room temperature
- Operating humidity:  $40\% - 60\%$ , storage  $30\% - 70\%$

### Conditions:

- Demonstration of the technical parameters mentioned in the tender, if requested by the committee for technical evaluation of the quoted instrument, will be required.
- Detectors should be space grade or must have space legacy – by being demonstrated on multiple Indian space missions. (Vendor must supply supporting documents along-with contact details of the users if requested).