



iWoRiD 2022

## 23rd International Workshop on Radiation Imaging Detectors

26 – 30 June 2022

Riva del Garda, Italy

Contribution ID: 86

Type: Poster

### Charge sharing in sub-millimetre CdZnTe linear array detectors grown by the vertical Bridgman technique

Monday 27 June 2022 17:15 (1 minute)

In the framework of the Avatar X project, we developed sub-millimetre CdZnTe linear arrays for high-flux spectroscopic X-ray imaging up to 150 keV. As widely demonstrated, CdZnTe (CZT) is one of the key materials for the development of room temperature X-ray and gamma ray detectors and great efforts have been made on both the device and the crystal growth technologies. In this work, we will present the results of spectroscopic and charge sharing investigations on new boron oxide encapsulated vertical Bridgman (B-VB) grown CZT detectors with linear pixel anodes, recently developed at IMEM-CNR Parma, Italy [1,2]. CZT linear arrays with pixel pitches of 250  $\mu\text{m}$  and inter-pixel gap of 25  $\mu\text{m}$  were developed. The X-ray response of the detectors was measured taking into account the mitigation of the effects of incomplete charge collection, pile-up, charge sharing and high flux radiation induced polarization phenomena. Preliminary tests showed good room temperature energy resolution FWHM of 4 % (2.4 keV) at 59.5 keV at high bias voltage operation (7000 V/cm).

[1] L. Abbene et al., J. Synchrotron Rad. 27 (2020), 319-328.

[2] L. Abbene et al., Nucl. Instr. and Meth. A 835 (2016) 1-12.

The authors acknowledge funding from the Italian Ministry for University and Research (MUR), under AVATAR X project No. POC01\_00111 and from the European Union (EU) under the project - FESR o FSE, PON Ricerca e Innovazione 2014-2020 - DM 1062/2021.

**Primary authors:** Dr BUTTACAVOLI, Antonino (University of Palermo); Prof. PRINCIPATO, Fabio (University of Palermo); Prof. GERARDI, Gaetano (University of Palermo); Prof. CASCIO, Donato; Prof. RASO, Giuseppe (University of Palermo); Dr BETTELLI, Manuele (IMEM/CNR Parma); Dr ZAPPETTINI, Andrea (IMEM/CNR Parma); Dr ZANETTINI, Silvia (Due2lab srl)

**Presenter:** Dr BUTTACAVOLI, Antonino (University of Palermo)

**Session Classification:** Poster