

# Development of an Ultra-Tiny Hand-held Compton Camera for Minimum Spaces

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We will demonstrate on newly developed ultra-tiny hand-held Compton Camera, which is able to be inserted into minimum spaces such as a laparoscopic port or ducts in nuclear power plants.

**Keywords:** Gamma ray Imaging, Compton Camera

## 1. Introduction

In the surgical fields, intra-operative <sup>18</sup>F-FDG detection has been required for less-invasive surgery [1]. We have developed an ultra-tiny hand-held Compton camera, which is able to be inserted into laparoscopic ports to be placed as close as possible to objects to enhance its efficiency and spatial resolution.

## 2. Material and Methods

Our Compton camera consists of Though Silicon Via (TSV) type Multi Pixel Photon Counters (MPPCs, HAMAMATSU, S12892PA-50), relatively new semiconductor photo detector, coupled one-by-one to GFAG scintillator crystals ( $2 \times 2 \times 3 \text{ mm}^3$ ) [2]. It has diameter of  $\phi 11.8 \text{ mm}$  and 4 layer of 12 pixels cross-shape MPPC-GFAG array (Fig. 1).

## 3. Results and Conclusion

For a shielded <sup>22</sup>Na source where individually placed 10 mm in front of the detector of the center and the left top, these reconstruction images were clearly resolved and spatial resolution of 4 mm (FWHM) was achieved (Fig.2). Other imaging results and read-out electronics will also be presented on the conference.

## References

- [1] Molina MA, et al., Cancer Imaging, 2009, 9, 56-62.
- [2] <http://www.c-and-a.jp/GFAG.html>

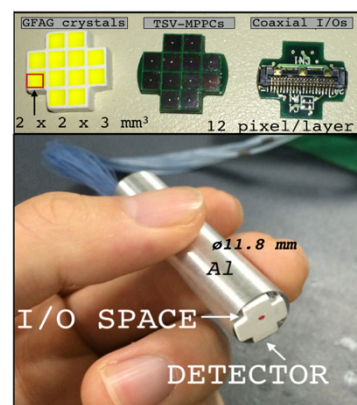


Fig.1 A photograph of our Compton camera

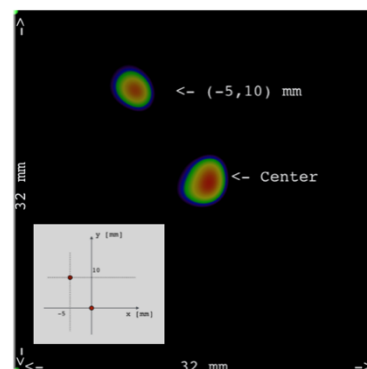


Fig.2 A reconstruction DICOM image