Performance of monolithic BGO crystals as gamma detectors using a Neural-Network event decoding algorithm

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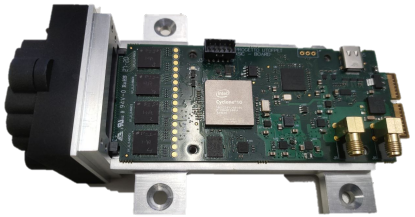
BGO has been the preferred scintillating material in PET applications for decades, until the need for time-of-flight acquisitions moved the preference to LYSO a faster, but more expensive and less versatile scintillator. In this work we demonstrate experimentally and in simulation that with the use of AI decoding algorithms, BGO can comply with time-of-flight speed requirements and thus become a competitive candidate for gamma ray detection.

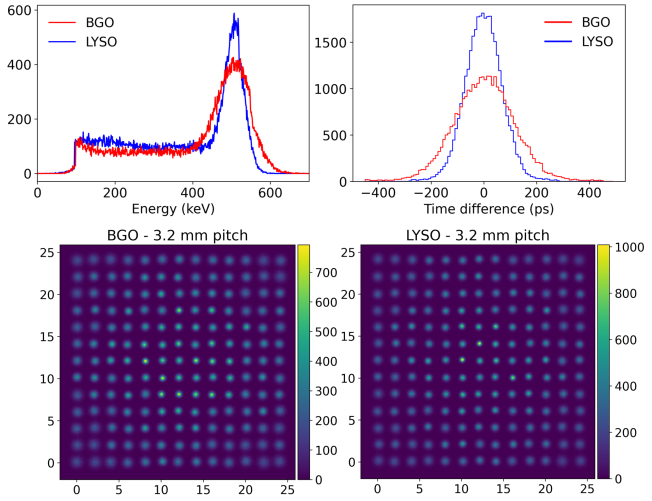
Achieved performance (experimental data)

	CTR (ps)	SR (mm)	Energy Res. (%)
3.2 mm LYSO	**160**	**0.8**	**12.7**
3.2 mm BGO	**320**	**0.8**	**20.2**

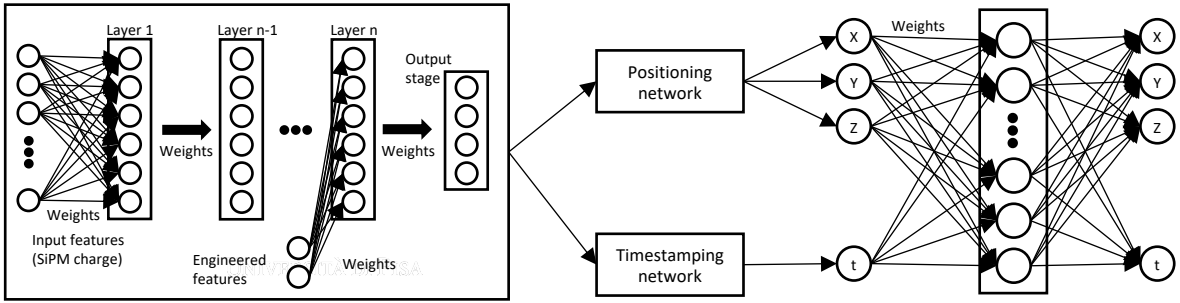
DAQ based on the HRFlexToT ASIC



Energy spectra (top left), CTR (top right) and flood maps (bottom)



Neural network architecture



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