

phenoPET: A PET scanner for Plants based on digital SiPMs

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The PET scanner *phenoPET* is a system dedicated for plant research developed and used for phenotyping studies at the Research Center in Jülich. The scintillation detectors use LYSO scintillator crystals of $1.85 \times 1.85 \times 10 \text{ mm}^3$ size (Crystal Photonics, Inc.) and digital Silicon Photomultipliers as photodetectors (Philips DPC). 4×4 crystals share 2×2 photodetector pixels at a time. Controlled light spreading guarantees clear identification of the individual crystals.

The whole scanner is equipped with more than 36000 crystals. Unlike to clinical PET scanners the detectors are arranged in a horizontally oriented ring which allows scanning of plants in an upright position. The field of view measures 18 cm in diameter and 20 cm height.

A recent revision of firm- and software resulted in an increased bandwidth of the data acquisition system, allowing dynamic studies of up to 120 MBq in the field of view. For the sensitivity in the center field of view we now obtain a value of 9.2% ($\Delta E=250\text{-}750\text{keV}$).

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