

# The Nikhef two photon absorption setup

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To be able to separate different vertices after the High Luminosity upgrade at the LHC, timing information about the measured particles is needed. This presentation describes the characterization and first measurements of a TPA setup, build to test if future sensors reach the timing requirements needed for future use in the HL-LHC. The first part of this presentation describes the setup and its characterisation. A beam waist of  $0.995 \pm 0.035 \mu\text{m}$  was found. Next I will present how the stability of the TPA signal was characterised and corrected, resulting in a standard deviation of 3.6%, and a maximum deviation of 11.7% of the corrected signal. The second part of the presentation describes the first intrapixel timing measurements on three different assemblies with the new setup. These measurements show the advantages of the TPA setup, by making it possible to observe the metalization layer of the sensor, and showing the timing resolution of the sensor at different depths inside the silicon. A timing resolution of  $\pm 0.6 \text{ ns}$  for a  $200 \mu\text{m}$  thick n-on-p Timepix3 assembly was found, and a timing resolution of  $\pm 0.55 \text{ ns}$  for a  $300 \mu\text{m}$  thick p-on-n Timepix3 assembly. These results show that the setup can perform the necessary timing measurements, offering a reliable testing facility next to test beam measurements.

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