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Beam tests of sensors for a compact electromagnetic calorimeter

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Sensor samples for a future compact electromagnetic sampling calorimeter were tested in DESY-II electron beam in 2021 and 2022. The sensors are made of silicon and GaAs with the size of 5×8 cm^2. They are 320 μm and 500 μm for the silicon and GaAs sensors in thickness, respectively, and the pad size is 5×5 mm^2. The compactness of the sampling calorimeter requires the readout through traces connected to the pads and to bond pads at the edges of the sensors. For the silicon sensors, copper traces on a Kapton foil are used, connected to the sensor pads with conducting glue. The pads of the GaAs sensors are connected to the bond pads via aluminium traces on the sensor substrate. The whole data readout system is orchestrated by a trigger logic unit (TLU). With the telescope, the effects of the traces and the bond pads are studied. We will show the preliminary results for the homogeneity of the response, edge effects at pads and sensors, and cross talk due to the readout traces.

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