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The 2.6m-high Xenoscope TPC: design, assembly, and first results

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The DARWIN project aims to build and operate a next-generation observatory for dark matter and neutrino physics, featuring a time projection chamber (TPC) with a proposed active target of 40 t of liquid xenon (LXe). Xenoscope is a full-scale vertical demonstrator for the future DARWIN detector built at the University of Zürich. Its main objective is to demonstrate electron drift over unprecedented distances in LXe in a dual-phase TPC. The cylindrical R&D detector has a diameter of 16 cm and a total drift length of 2.6 m, corresponding to the foreseen height of DARWIN. The TPC is instrumented by an array of 192 VUV-sensitive 6x6 mm² SiPMs (Hamamatsu VUV4 MMPCs) with a custom 12-channel summed readout. The array is placed above the active target and operated as a light readout for the proportional scintillation signals of the TPC. This talk will present the design and assembly of the dual-phase TPC of Xenoscope, with special focus on its array of VUV SiPMs, as well as its first recorded data and results.

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