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The alignment of the drift tube linac for the Compact Pulsed Hadron Source

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The Compact Pulsed Hadron Source (CPHS) at Tsinghua University is one multi-purpose pulsed neutron source. The linac of the CPHS mainly consists of a proton source, a low energy beam transport line (LEBT), a radio frequency quadrupole (RFQ) and a drift tube linac (DTL). DTL is positioned downstream the RFQ accelerator and accelerates the beam from 3 MeV to 13 MeV with the peak current of 50 mA, so as to meet the energy demands for the beam bombarding the target. The main structure of the DTL consists of 2 cavities, 39 drift tubes, 2 base plates and 2 flanges. There are 41 permanent magnet quadrupoles (PMQs) mounted in drift tubes and flanges to focus the beam. The mechanical design and machining process of the drift tubes are complicated, and each PMQ needs to be installed within the error tolerance of $\pm 0.2\text{mm}$ in the transverse direction and $\pm 0.3\text{mm}$ in the longitudinal direction. The machining and alignment measurement of the drift tube are one of the key technologies of the CPHS DTL. This paper presents the progress of the CPHS project, together with the alignment result of the drift tubes inside the cavity and the DTL cavity in the beam line.

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