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Improving 3D longitudinal network measurement by using stretched wire

Standard 3D measurements showed that it is difficult to align accurately the components of a particle accelerator in a narrow and straight tunnel due to the configuration of the network. When one makes use of a total station or a laser tracker for example, the radial alignment of the components diverges quickly if conventional alignment methods are used.

We propose to add measurements w.r.t a stretched wire to free stations (laser tracker or total stations) 3D measurements in order to make a longitudinal network more robust. First, we describe our adjustment method, based on the least squares method, with the addition of special constraints on the point coordinates due to the presence of the wires. Then, results of the simulations and of real measurements are discussed.

Summary

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