

LARGE SCALE METROLOGY AT CERN: LENGTH AND OFFSET CALIBRATION BENCHES AT MICROMETRIC ACCURACY

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ABSTRACT

The metrology of very large accelerators (up to 27 km circumference) and of their huge detectors is a very demanding activity, in terms of accuracy and reliability. Present requirements are commonly in the vicinity of 0.1 mm (rms), but future accelerators will focus particle beams to a few nanometers – and their alignment will need to be controlled within a few micrometers. Special instruments have been designed and developed on purpose at CERN and in collaboration with Industry, and some commercially available instruments used there are pushed to their extreme capabilities. The 60 m long calibration facility has evolved according these special needs, on the frontline of adequate technologies : the length calibration bench has been fully renewed and automated, and a unique offset & alignment calibration bench has been designed and implemented.

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