

LINEARIZED AND COMPENSATED INTERFEROMETRIC SYSTEM FOR HIGH-VELOCITY TRACEABLE LENGTH CALIBRATION ON A METRE SCALE

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We report on a traceable calibration system for a 3500mm-long console that carries a measurement system for inspecting the diameter of a circular water pool. The system uses two single-pass laser interferometers with homodyne fringe detection for measurement in two degrees of freedom. The hybrid FPGA-microcontroller control module carries out the fringe detection together with the application-specific scale linearization approach and the compensation of environmental influences such as thermal elongation and the refractive index of air fluctuations. We demonstrated the system feasibility with an accuracy of a few microns and translation velocity close to one metre per second.