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# A novel calibration method for the High Luminosity LHC wire positioning system sensors

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The High Luminosity-Large Hadron Collider (HL-LHC) is an ambitious project aiming to upgrade the LHC to achieve substantially more collisions to increase its potential for new discoveries after 2030. As part of this upgrade, 220 m of new components will be installed on both sides of the interaction points of the ATLAS and CMS experiments. The upgrade includes the installation of over 300 Wire Positioning System (WPS) sensors. Each sensor must be calibrated individually on-site, requiring a fast, accurate, portable and user-friendly calibration bench. This paper introduces a new mobile calibration bench capable of performing both relative and absolute calibrations simultaneously and to determine the absolute polynomial coefficients unique to each sensor. It details the underlying mathematical framework, preliminary test results, and highlights the advantages over the previous generation of test benches. The paper also presents the return of experience gained from the first field tests.

## Footnotes

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