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WIRE POSITION MONITOR USED AT ADS LINAC ALIGNMENT

This paper introduces the design and simulation of a WPM (Wire Position Monitor) used in the cryogenic system of an Accelerator Driven System (ADS). The WPM is designed to monitor the contraction of cold masses during the cooling-down operation. In this paper, POISSON-2D electrostatic field software is used to calculate the best characteristic impedance for the WPM. Furthermore, the time domain signal of different end structures is theoretically analysed and simulated, the results are consistent. The coupling between electrodes and unparallelism between wire and wpm which may influence the induced signal, are also discussed. The influence of unparallelism is much bigger. A calibration platform is designed to calibrate wpm, the detailed design are introduced. The relationship between the sensing voltage and wire position is nonlinear, high order polynomial is used to express the nonlinear relationship. The RMS of polynomial fitting error is 3.8um at x direction, 7.4um at y direction. The alignment test is carried out on the beta cryostat. Optical instruments are used to verify the WPM measuring result. The variances of the difference between WPM measuring results and optical measurements are 0.044mm in x direction and 0.05mm in y direction. At last the measuring results at ADS cryostat alignment are demonstrate, the biggest contraction is 1.2mm in X direction, 1.0mm in Z direction

Primary author: Ms ZHU, Hongyan (IHEP)

Co-authors: Mr LI, Bo (Accelerator Center); Mr DONG, Lan (IHEP); Mrs MEN, Lingling (Institute of High Energy Physics, Accelerator Division); LIU, can (ihep)

Presenter: Ms ZHU, Hongyan (IHEP)