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Straightening of APS LINAC Accelerating Structures Utilizing a Portable Articulating Arm CMM

The Advanced Photon Source linear accelerator system utilizes 3-meter long SLAC-type 2856 MHz accelerating structures. Surveys of the APS LINAC indicated distortion in the straightness of the accelerating structures over time, with 7 mm of sag detected in the worst case. A long-term project to straighten the accelerating structures, swapping them out one-by-one and straightening those removed, was implemented. The straightening is intended to improve charge transportation efficiency and minimize wakefield effects in the structures. The first straightened structure was installed in fall of 2015, and the swaps will continue until all 13 APS LINAC accelerating structures have been straightened. A portable 3-D articulating arm CMM is utilized to accomplish the straightening of the structures to a tolerance of ± 200 microns. Techniques used at the APS to straighten the LINAC accelerating structures and achieved results are presented.

Summary

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