Abstracts

The Automatic Phasing System for the Stanford Two-Mile Linear Electron Accelerator (Nov. 1965 [T-MTT])

C.B. Williams, A.R. Wilmunder, J. Dobson, H.A. Hogg, M.J. Lee and G.A. Loew. "The Automatic Phasing System for the Stanford Two-Mile Linear Electron Accelerator (Nov. 1965 [T-MTT])." 1965 Transactions on Microwave Theory and Techniques 13.6 (Nov. 1965 [T-MTT]): 806-814.

This paper describes the system for automatically phasing 240 high-power klystrons that drive the stanford two-mile linear electron accelerator. After a brief discussion of the requirements of a phasing system for such a long machine and a review of some alternative methods which were initially considered, the principle of "Beam-Induction" phasing is described. Advantages of the "Beam-Induction" technique are listed, and the problem of obtaining phase error information from accelerator signals varying over a 54-dB power range is considered. It is shown that the problem may be solved by the use of coaxial thermionic diodes, which have nearly linear detection characteristics. The concept of phase-wobbling is introduced. It is shown that this idea may be used to design an ac servo system, avoiding problems with dc amplifier stability. Phase wobbling is also seen to remove phasing errors due to imperfect matching of the diode pair. The installation and operation of the automatic phasing system in a typical sector of the machine is briefly described. In conclusion, some results of preliminary tests on the first two sectors (660 feet) of the machine are presented.

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