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Current Status of Nanometer Beam Size Monitor for ATF2

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The Accelerator Test Facility 2 (ATF2) is an extension of the ATF beamline extraction featuring an ILC-type final focus system. Among the projects major purposes is establishment of hardware and beam handling technologies aimed at transverse focusing of ATFs electron beams to below 40nm in the vertical. A laser-interferometer type high resolution beam size monitor named the “Shintake Monitor” is installed at ATF2’s virtual interaction point plays a crucial role in achieving this aim. A laser interference fringe is formed by crossing two coherent laser rays. This functions as an interaction target for probing the electron beam. Beam size sensitivity of the monitor depends on the pitch of the interference fringe, and maximizes at about one fifth of the pitch. The Shintake Monitor at ATF2 is designed to be capable of easuring beam sizes ranging from 6 microns down to 20 nm in vertical. A vertical beam size of approximately 300 nm has been measured at May 2010 run. For the most recent run, owing to switching beam optics back to nominal, BG levels rose about 10 times from May. Shintake Monitor had been proven in May to fulfill expectations provided BG is low. However with high BG, its accuracy decreased, which makes low S/N a major concern. In this paper, we describe the design and current status of the monitor.

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