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# High resolution laserwire electron beam size measurements and fibre laser development for high repetition rate laserwire applications

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A laserwire is a non-invasive, high resolution particle beam size monitor based on Compton scattering that is required for future planned colliders and can also be used to estimate the size of the source in wakefield acceleration experiments. We present recent results from the high resolution laserwire transverse electron beam diagnostic installed at the Accelerator Test Facility 2 (ATF2) electron accelerator at KEK in Japan. Full characterisation of the propagation of the 150mJ, 167ps laser beam is used to deconvolve the transverse laserwire profile demonstrating the successful measurement of 1um scale vertical electron beam sizes, even with extreme aspect ratios. We also present progress in the development of high energy photonic crystal fibre based laser systems for laserwire measurements at MHz repetition rates, suitable for intra-bunch train scanning for planned accelerators such as the International Linear Collider, or beam size measurement in laser or particle driven plasma accelerators.

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