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The Transverse Energy and Momentum Analyser system

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The minimum achievable particle beam emittance in an electron accelerator depends strongly on the intrinsic emittance of the photocathode electron source. Reducing the electron beam emittance in an accelerator which drives a FEL delivers a significant reduction in the saturation length for an X-ray FEL, thus reducing the machine's construction footprint and operating costs whilst increasing X-ray beam brightness. The intrinsic emittance is correlated to the mean transverse energy (MTE), therefore measuring the MTE is a notable figure of merit for photocathodes used as electron sources. This work presents the Transverse Energy and Momentum Analyser (TEMA), a system which will measure the MTE of different cathodes, such as Cs₂Te currently used at FLASH and European XFEL.

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Footnotes

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