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## Energy resolved emittance measurements and chromatic emittance growth of laser-wakefield accelerated beams

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A crucial parameter for the demonstration of a laser-plasma driven free-electron laser is the electron beam emittance and its stability. Here, we show energy resolved emittance measurements of ionisation-injected plasma electron beams performed with both a conventional quadrupole scan and measured from single-shots. We show that the initial phase-space properties obtained from both methods deviate by less than 10 % and are constant over a narrow energy-band considered for the retrieval. The initial beam emittance is as low as 0.7 mm mrad. Finally, we demonstrate first measurements of chromatic emittance growth for laser-plasma accelerated electron beams.

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