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Experiments on laser plasma acceleration driven in longitudinally-profiled plasmas

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Techniques for increasing the energy gain per stage of laser-driven plasma accelerators are of great interest. One way of achieving this is to control the dephasing of a beam with respect to a plasma wave driven by a short-pulse laser by applying tapered plasma channels or longitudinal plasma density variations.
We present the results of experiments at the Lund Laser Centre, Sweden and at the Rutherford Appleton Laboratory, UK on laser plasma acceleration driven in longitudinally-profiled plasmas. The energy, pointing stability and divergence of the electron beams generated in these plasma targets will be described. Measurements of the x-ray spectrum from betatron motion of the electron bunch will also be reported.

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