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Mono-energetic electrons from laser wakefield experiments: stability and future scaling

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A great deal of interest in laser wakefield accelerators has been generated since the discovery that they can produce high quality (low emittance and low energy spread) ultra-short (less than 25 fs) relativistic electron beams. This talk will cover the ongoing research led by Imperial College at the Rutherford Appleton Laboratory and Lund Laser Centre. By controlling the laser parameters including contrast ratio, pulse duration and focusing geometry we can significantly improve the quality and stability of the electron beam produced in self-injected laser wakefield experiments. We will also discuss the scaling of laser wakefield accelerators to PW class lasers such as the Astra Gemini system at the Rutherford Appleton Laboratory.