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Laser Plasma Acceleration Generated Electron Bunch Transport for in a Manipulation Line

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Laser Plasma Acceleration (LPA) enables to generate up to several GeV electron beam with short bunch length and high peak current within centimeters scale via different schemes. However, the generated beam quality (energy spread, divergence) is not sufficient to drive a Free Electron Laser (FEL) and a beam control is required. The COXINEL manipulation line is composed of high gradient variable quadrupoles (QUAPEVA) in conjunction with electromagnetic quadrupoles, a chicane and a 2 m long undulator of 18 mm period. The transverse distribution of the electron bunch can be measured in five different positions along the transport line and the energy distribution can be characterized beforehand in a spectrometer. The electron beam has been properly transported. The experiments and the modeling are presented and they show good agreement. A next step for a better understanding and modeling of the transport via LPA source simulation is foreseen.

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