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Online Diagnostics and Stabilisation of the ANGUS 200 TW Laser

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Laser-plasma accelerators are prominent candidates to drive a next generation of high-brightness x-ray sources. The LUX laser-plasma accelerator, driven by the ANGUS 200 TW laser, has recently demonstrated the generation of few-nm-plasma-driven undulator radiation. Long-term operation of the plasma accelerator with reproducible and stable electron beams requires a highly stable drive laser. To reach this goal, we have integrated the ANGUS laser in an accelerator-grade control system. Enabled by the analysis tools at every stage we observe that changes in the front-end of the amplifier chain have a direct impact on both, laser parameters in all amplification stages and the properties of the generated electrons. We will report on long-term-drifts we have observed during laser operation and their effects on the laser system. Furthermore, we will present methods to stabilise the laser against these drifts.

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