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# A tale of three beams: towards stable and reproducible operation of the AWAKE facility

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The Advanced Wakefield Experiment (AWAKE) relies on proton-driven wakefields created in a laser-ionized plasma to accelerate electrons. Accurate measurement and control of the optics, trajectory and timing of the three beams—proton, laser and electron—is a fundamental requirement for successful operation of the facility. Continuous advances in both instrumentation and methods are necessary to improve operational stability, reproducibility and efficiency. Since the three beams have drastically different characteristics, their performance is limited by different sources (such as thermal effects, magnetic hysteresis, current ripples, phase locking), requiring dedicated approaches. Recent improvements and measurement campaigns are described, highlighting the lessons learned. Finally, the challenges expected in future upgrades of the AWAKE facility are discussed.

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