

Planar-Waveguide External Cavity Laser Stabilization for an Optical Link with 1E-19 Frequency Stability

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We stabilized the frequency of a compact planar-waveguide external cavity laser (ECL) on a Fabry-Pérot cavity (FPC) through a Pound-Drever-Hall scheme. The residual frequency stability of the ECL is 1E-14, comparable to the stability achievable with a fiber laser (FL) locked to a FPC through the same scheme. We set up an optical link of 100 km, based on fiber spools, that reaches 1E-19 relative stability, and we show that its performances using the ECL or FL are comparable. Thus ECLs could serve as an excellent replacement for FLs in optical links where cost-effectiveness and robustness are important considerations.

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