Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Millimeter-long fiber Fabry-Perot cavities TORBEN POPPLAU, KONSTANTIN OTT, SÉBASTIEN GARCIA, FRANCESCO FERRI, Laboratoire Kastler Brossel, ENS/CNRS/UPMC, Paris (France), RALF KOHLHAAS, LNE-SYRTE, Observatoire de Paris/CNRS/UPMC, Paris (France), KLEMENS SCHÜPPERT, Institute for Experimental Physics, University Innsbruck, Austria, ROMAIN LONG, JAKOB REICHEL, Laboratoire Kastler Brossel, ENS/CNRS/UPMC, Paris (France) — We present the realization of fiber Fabry-Péerot (FFP) micro-cavities with concave mirrors that can be operated at cavity lengths as large as 1.5 mm without significant deterioration of the finesse. This is achieved by using a laser dot machining technique to shape spherical mirrors with ultralow roughness and employing single-mode fibers with large mode area for good mode matching to the cavity. Additionally, in contrast to previous FFPs, these cavities can be used over an octave-spanning frequency range with adequate coatings. We also show directly that shape deviations caused by the fiber's index profile lead to a finesse decrease as observed in earlier attempts to build long FFP cavities, and show a way to overcome this problem. Beyond concave mirror structures, the novel multi-pulse laser fabrication technique further allows to enlarge the range of accessible structures, including asymmetric mirror profiles, convex shapes on fiber tips and on macroscopic fused silica substrates.

Torben Popplau
Laboratoire Kastler Brossel, ENS/CNRS/UPMC, Paris (France)

Date submitted: 06 Feb 2017 Electronic form version 1.4