

















Fig. 6. (a) Measured spectral amplitude and phase of the QD-MLLD after 9 m of SMF at 340 mA (stars), 240 mA (squares) and 140 mA (circles). (b) Measured temporal intensity profile of QD-MLLD pulse after 119 m of SMF at 340 mA (solid line), 240 mA (dotted line) and 140 mA (dashed line).

#### 4. Conclusion

In conclusion we have demonstrated a linear self-referenced measurement of the spectral amplitude and phase of a QD-MLLD. In contrast to the previously demonstrated FROG characterization of this device this method allows the undistorted measurement of the spectral and temporal amplitude and phase characteristics of the laser both before and after dispersion compensation is applied. The technique is capable of measuring repetition rates up to 100 GHz and does not require any synchronized electronic clock to operate. With correct dispersion compensation we observe 500 fs pulses at a repetition rate of 39.8 GHz from a free-running QD-MLLD. We have also used the measurement to characterize the intracavity dispersion of the laser as a function of injection current.

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