High-power Laser System Synchronization Optimization

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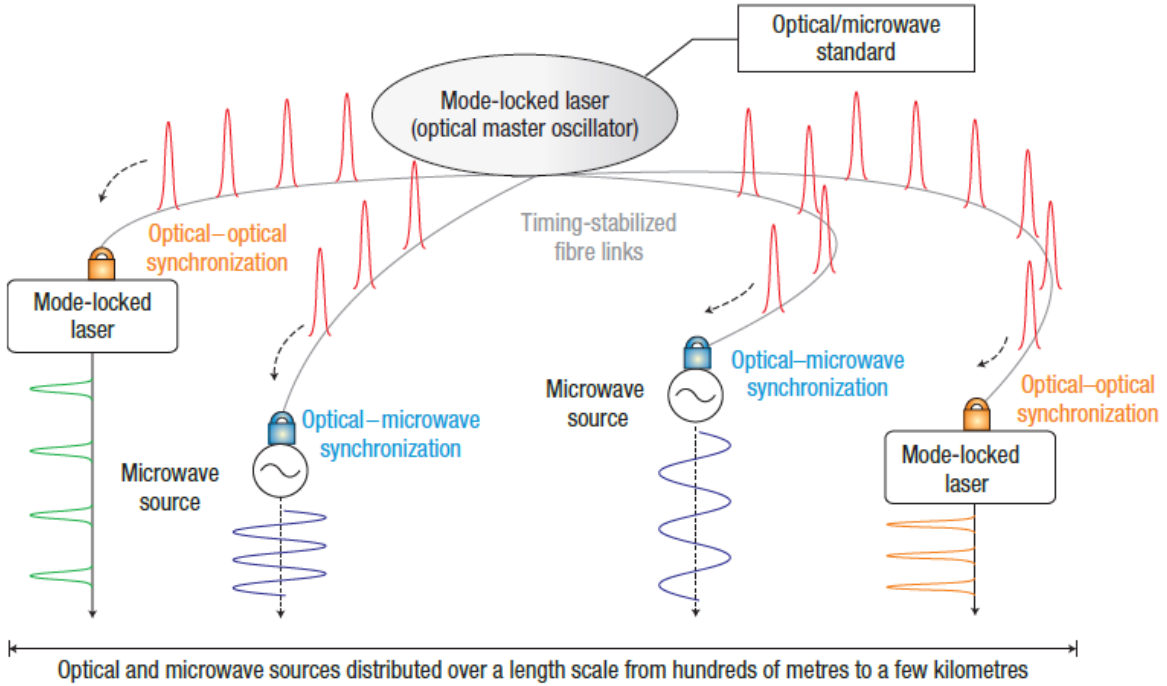
Introduction

- Importance of synchronization.
- Parts of the synchronization system at ELBE:
  - Reference RF oscillator
  - Optical Master Oscillator (OMO)
  - Timining-stabilized fibre links
  - Client sync- and locking
- Goal to reach < 100 fs overall jitter.



synchronization system structure [1]

[1] J.Kim, J.Cox and F.Kärtner, Drift-free femtosecond timing synchronization of remote optical and microwave sources.

Optimization work

- Upgrades and improvements
  - New Optical Master Oscillator
  - Building a client Optical-to-RF receiver
- Results, Challenges and subsequent work.

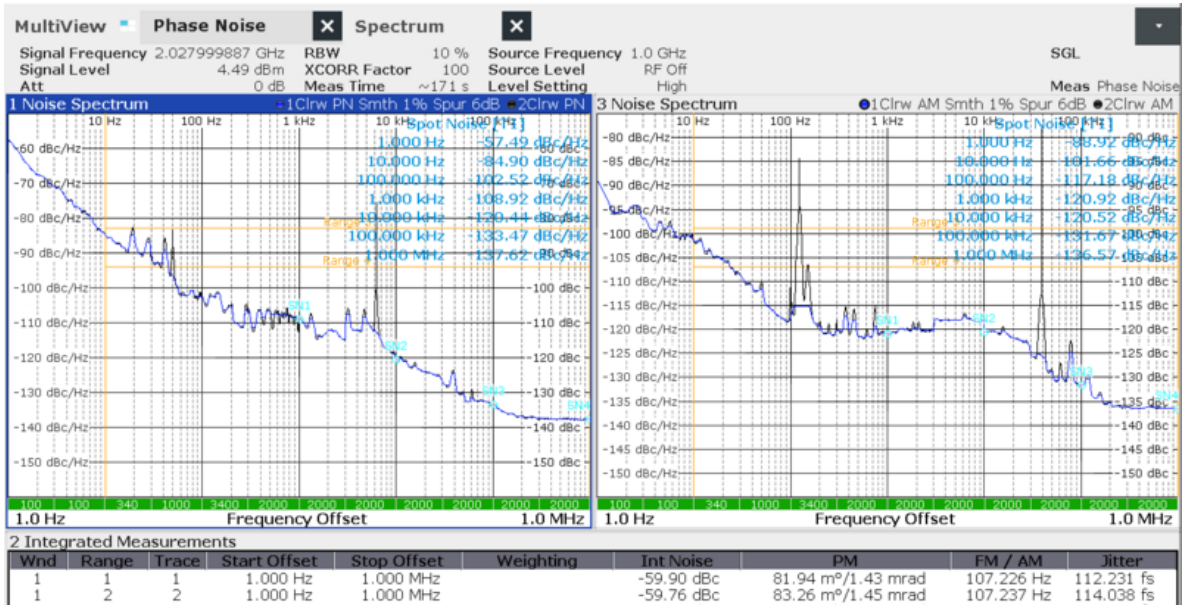


Figure1: Current Overall phase noise measurement

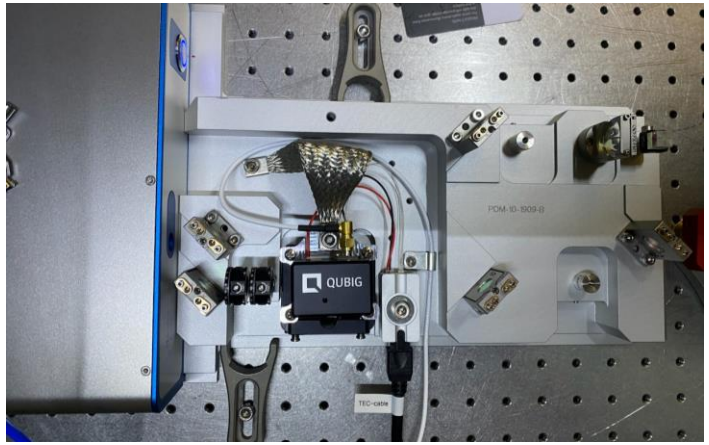


Figure2: New Optical Master oscillator + Pulse-Picker

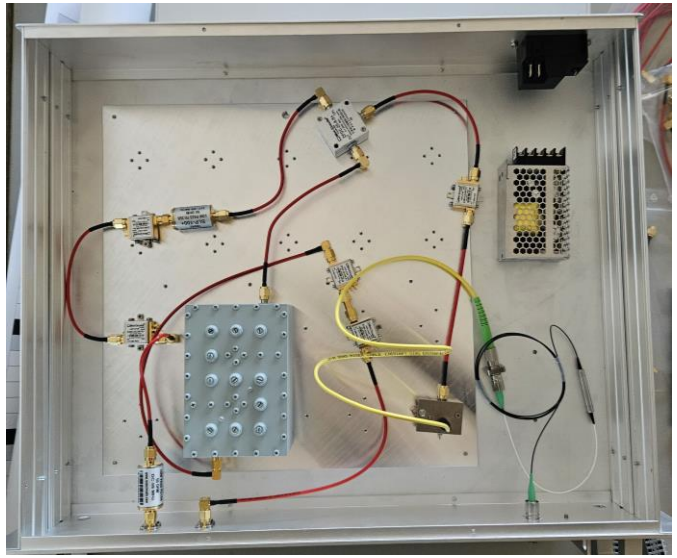


Figure3: Optical-to-RF Receiver