

WP 10: Use of Other Novel Technologies

Guoxing Xia

(on behalf of WP10 team: Ulrich Dorda, Barbara Marchetti, Andreas Walker, Jerome Fils)

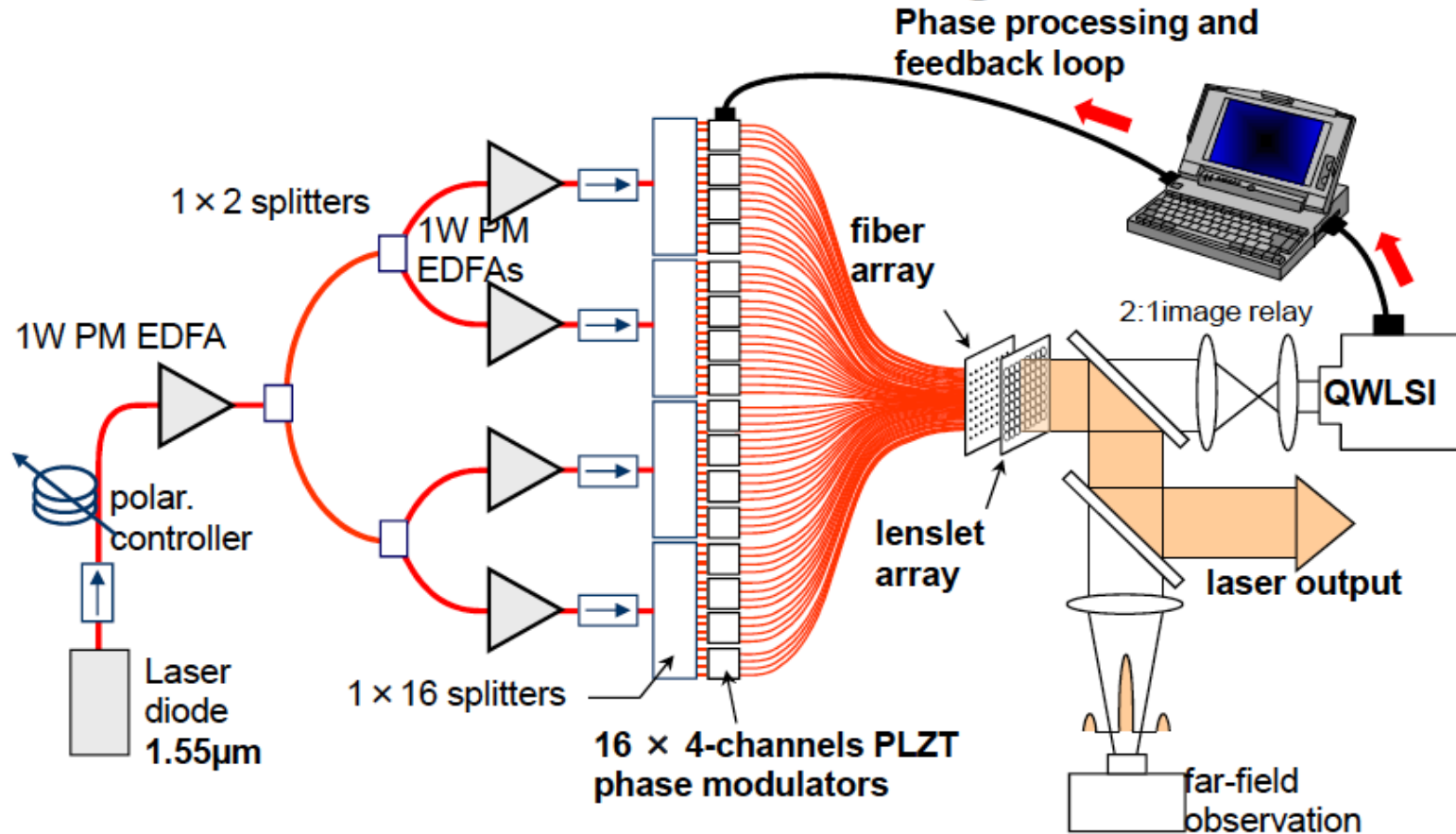
Topics to cover

- Fiber lasers for future laser plasma accelerators
- Multiple laser pulse driven LWFA
- Dielectric accelerators
- Cold atom based electron source
- Plasma beam dump for LWFA facility

Fiber lasers for future LWFA

- Current fiber lasers, physics and technology, current power limitation, transverse mode instabilities, noise performance, coherent combination of multiple fiber lasers, ICAN and XCAN techniques, status and their limitations

Coherent Fiber Combining



Achievement 2011
→ **64 phase-locked fibers**

Multiple laser pulse driven LWFA

- Principle, limitations, experiment plan and experimental results, possibility to achieve high repetition rate and relax the laser requirement?

Dielectric accelerators

- Current status of dielectric laser accelerators, THz driven dielectric accelerators and compact electron gun setup based on these schemes, the possibility as an external and compact electron injector for LWFA?

Cold atom based electron source

- Magneto-Optical Trap (MOT) based electron source, emittance, charge and temperature measurement, and possibility as an injector for LWFA.

Plasma beam dump for LWFA facility

- Theory, simulation and experimental plan on plasma beam dump (at CERN CLEAR or other electron facilities). The collective deceleration field can dump the beam energy efficiently (in short distance) and assure the overall compactness of the facility.

Milestones so far

- The WP10 runs teleconference regularly to exchange ideas;
- We are very glad that Dr. Jerome Fils (CEA) joins our meeting, with great input on fiber lasers;
- For fiber laser combination, we are in contact with e.g. Mourou group to learn about fiber prospects. We try to understand the fundamental limitations of fiber lasers as well as it's potential;
- For dielectrics, we review the latest results from world-leading labs and exchange the ideas;
- For using plasma as a beam dump, we published a paper and are now working on experimental preparation to test this scheme.

Thank you!