

WG4 - Summary of Day 1 Discussions



- ▶ LWFA driver strategies
 - Eric Esarey, *LWFAs for future colliders*
 - Stuart Mangles, *Nonlinear LWFAs for colliders*
 - ▶ Physics of nonlinear and quasi-linear regimes well understood
 - ▶ May want different regimes for different stages of accelerator
 - ▶ Quasi-linear regime allows use of multi-pulse drivers & bunch trains
 - ▶ Energy recovery could be important for efficiency & heat management

- ▶ Electron sources
 - Stefan Karsch, LMU, *Electron sources*
 - Jens Osterhoff, DESY, *Staging & coupling*
 - ▶ Many options for laser-driven injectors; more R&D needed to be collider relevant
 - ▶ Careful management of staging & coupling is required; more R&D needed



- ▶ Laser technology
 - Wim Leemans, LBNL, “kHz laser technology for LWFA applications”
 - Leo Gizzi, Pisa, *Laser drivers for EuPRAXIA*
 - Christoph Simon-Boisson, Thales, *Laser technology for high peak & high-average power*
 - ▶ There are concrete plans for EuPRAXIA 5 GeV, ~ 10 Hz beam
 - ▶ Several laser technologies have been identified, but significant R&D needed
- ▶ Positron acceleration in LWFAs
 - Spencer Gessner, CERN, *Summary of WG8*
 - Alexander Pukhov, Düsseldorf, *Hollow channels for positron acceleration*
 - ▶ Less mature at this stage
 - ▶ Consensus on need for more work in this area
 - ▶ Hollow channels likely needed; how to make them?
 - ▶ Novel cooling methods likely to be needed (bunches too short for damping rings)
 - ▶ More experimental facilities needed to test concepts. Possibilities are EuPRAXIA, APOLLON, RAL ...

- ▶ Should we seek to replace only linac components?
 - To realize all possible benefits we feel that complete solutions will be needed
 - There could be opportunities in re-visiting all collider components
- ▶ Do we agree with 30 TeV, $L \sim 1E36$ goal?
 - Yes, but we should also explore lower energy goals (e.g. 250 GeV, 1 TeV)
 - A phased development is preferred
- ▶ An intermediate 50 - 100 GeV demonstrator would be desirable, but physics case not clear
- ▶ Document organization
 - Prefer to organize in terms of machine components, not ANA technologies
- ▶ What would we like?
 - Virtual institute
 - Funding for experiments, travel, post-docs, students
 - Dedicated accelerator test facilities / target areas, including positron capabilities