Discussion Session

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Purpose of the Meeting

- **Review studies** since the last meeting (Sept 07)
- **Assess R&D requirements** for whole of positron source
  - ➔ Generate prioritised list
  - ➔ Take account of reduced resource level when estimating timescales
- **Assess possible cost reduction** measures
  - ➔ Agree list of possible measures
  - ➔ Put list into priority assessment order
  - ➔ Agree how to take priority items forward
- Discuss **new work breakdown structure**
  - ➔ Earlier structure no longer viable
  - ➔ Reduced number of WPs to reflect reduced resource

Allocation of Summaries

- Half page summaries of each session please

- Collimation – Ian
- Undulator – Jim
- Compton Source – Jim
- Target – Leo
- Polarisation – Sabine
- Remote Handling – Ian
- Source Modelling – Jim
- OMD - Jeff

Collimation

- Study of Photon collimators in undulator – Adriana, EPAC
  - ➔ Heat load, activation, vacuum level, materials, …
- High power photon collimator needs to be studied and engineered
  - ➔ Report from Lei on heat loading, activation (next meeting)
- Positron collimation – design documented, needs updating as source evolves

Undulator

- Generate beam test plan – Jim (next meeting)
- Horizontal magnet measurements required at some stage
- Electron beam tests required at some stage
- Modules need to be engineered for large scale production and operation
- Intermodule connections need engineering
- “Real” Undulator spectrums required for modelling of source – Duncan (next meeting)
- Write a Report on vertical test results – Nick/Duncan (next meeting)
- Store cryomodule safely so can be powered at a later date – Jim
- Alignment requirements justified/jitter studies/impact on polarisation

Target

- Complete Eddy current tests at Daresbury – Ian/Leo Nov 08 (store properly afterwards!)
- Generate simulations to compare with experimental results – Jeff / RAL? Nov 08
- Pressure shock wave analysis – Stephan (next meeting) and numerical modelling – Tom (later)
- Guarding thickness verification – Tom (now)
- Ensure consistency between ANL/DESY simulations – Wei/Andriy (next meeting)

  ➔ Energy compression before DR
- Lifetime studies of target (LLNL)
- Engineered solution, including prototype tests – water, vacuum, ...
- Alternative liquid metal (BINP/KEK tests) – Junji
- Where are ferrofluidic seals used – Ian (next meeting)

Compton

- Continue DR stacking studies and work with DR group to ensure optimum solution - Frank
- cavity stability tests (LAL/KEK) - Omori
- Laser demonstration – Fabian Zomer, Vitaly
- ATF demo – Omori
- 2010 demo of high gamma flux at ATF

Polarisation

- Write brief report justifying need for 5Hz positron spin flipping at some point and ability to reverse – Sabine (next meeting)
- [Scheme to destroy polarisation in DR completely – Des Barber]
- Low energy polarimeter – check impact of foil temperature on performance & background studies – Ralph (next meeting)
- Close contact with IP group polarimeter
- Ensure spin survives to DR
- Electron spin also within undulator – Des early 09
- Close contact with simulations group – spin track to IP
- Optimise spin rotator design (5GeV/125MeV?)

Remote Handling

- Preliminary use of detailed target model in Fluka – Luis/Lei/Andriy (next meeting)
- Collimator in RH (next mtg)
- Activation of water - Luis/Lei/Andriy (next mtg)
- Shielding thickness around target etc – Andriy (next mtg)
- RH scenarios refined
  - ➔ Changeover times (requirement ties in with lifetime of kit in RH)
  - ➔ Replacement of pillow seals?
- Auxiliary source (needs RH as well) – KEKB?
- Pillow seals need R&D
- Need engineered design compatible with source layout (remove inconsistencies!)
- If yield increases then RH not needed (limited only?)

Source Modelling

- Write-up undulator emittance effect – Wei (next meeting)
- Benchmark G4 polarisation/yield against other codes – Andriy/Andreas (next meeting)
- Study activation of linac after target, copper vs aluminium – Andriy (next meeting)
- Re-evaluate undulator K if target/OMD changes (Wei)
- Ongoing yield/polarisation evaluation with source design evolution (Wei)

- Li Lens
  - ➔ Evaluate level of radiation damage in window & implications for lifetime
  - ➔ Stress-strain in window
  - ➔ Thermal cycling fatigue
  - ➔ Cavitation wear on windows
  - ➔ Proton beam tests?
  - ➔ Contact experienced Li lens experts to discuss this idea (Jerry Dugan?) – Marc to provide names
  - ➔ KEKB BN window tests (liquid lead target)
- Flux Concentrator
  - ➔ Need feasible design

Other Issues

- Begin “system integration” engineering – Norbert/Jim/John
- Define new specification for Auxiliary positron source – Jim
- Understand timing issues for ILC, work with DR group to look at options – Jim/Andy W
- Establish link with KEKB high intensity conventional source project – Jim/Kamitani

Priorities for R&D

- Priority 1 – major impact on feasibility/performance
  - ➔ Target
  - ➔ Compton Source
    - Stacking, cavity stability, laser, ATF demo, …
  - ➔ Remote Handling design
  - ➔ OMD (Li lens & Flux Conc)
  - ➔ SW NC Linac (SLAC/DESY Z PITZ?)
- Priority 2 – Necessary but not expected to be critical
  - ➔ High power photon collimator design
  - ➔ Undulator beam tests
  - ➔ SCRF Linac designs

Cost Issues

- Re-establish RDR "Baseline" Cost and answering Peters queries – Jim/Peter/Norbert
- Change undulator location to end of main linac
- Change underlying assumption of yield of 1.5 e^+ in DR for every e^- in undulator
- Reduction of DR acceptance allowed – discuss with DR experts
- Reduce undulator chicane offset from 2.5m to <1m – Jim/Norbert
  - ➔ Use dog-leg instead (linacs no longer coaxial)
  - ➔ Use 3 bump insert
- Maximise e^+ polarisation to increase effective luminosity, enabling scaling back of ILC parameters
- Remove keep alive source, auxiliary source only - Jim
- Maximise yield (eg Li lens, energy acceptance) - All

Future Meetings

- Proposal
  - ➔ Mini-meeting to report on action item progress ~July 08 by Webex only
  - ➔ Next full meeting before end of 2008
    - Directly before LCWS (Nov 08, Chicago)
    - Oct 08 at Daresbury

Thanks

- Many thanks to Sabine, Andreas, and Martine for organising and hosting us flawlessly this week