Welcome and Introduction to the Workshop

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ILC Positron Source Collaboration Meeting
29 – 31 October 2008
The Cockcroft Institute, Daresbury Laboratory

Science & Technology Facilities Council
Daresbury Laboratory

The Cockcroft Institute
of Accelerator Science and Technology

Welcome

- Welcome to Daresbury Laboratory & The Cockcroft Institute
- For any help with taxis etc please contact Sue Waller (sue.waller@stfc.ac.uk, or room S 01 on top floor)
- The meeting is scheduled to finish at lunch time on Friday
- Leo has offered to give a tour of the target experiment to anyone who is interested on Friday after lunch (will take ~1hour)

Purpose of the Meeting

- Review the R & D
- Review the action items from the last meeting
- Understand the Minimum Machine proposals
- Plan Positron Source work for 2009

- Be trained in EDMS and agree how we will use it

Actions from Zeuthen Meeting

- The following slides are taken from the last meeting
- We'll try to keep track of these as we go through the presentations
- In the closing session we'll review these and assign new actions!

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