R&D Issues WG3 & 4

- DR feedback and stability
  - Near demonstrations at 3rd generation SR sources
  - Good to complete a more detailed comparison with NLC and TESLA DRs and ATF at KEK, ALS, APS, ESomRF, SNS, ….
    - Incoherent motion amplification
    - Measured motion → implied element motion
    - Stability of measurement devices
  - Also add emittances, dispersions, and aspect ratios
    - Random alignment tolerances
    - Measured emittances → implied effective alignment
    - Lifetime / stability of emittances
  - Beam extraction stability ?? (scope creep)

R&D Issues WG3 & 4 (2)

- Linac vibration and stability
  - Quadrupole vibration EM / SC / PM → stability
    - All are driven by vibrations from rf
      - High power in NC designs
      - Lorentz force in SC designs
    - Coolant induced vibration
    - Active program for vibration in NC designs – SC design??
  - Is it necessary to make measurements at a dedicated test stand
    - How to do this for quads in a cryostat?
    - What is effect of rf breakdowns?
  - Diagnostic stability
    - Tolerances ~1um/week in NC and ~10 um/week in SC

R&D Issues WG3 & 4 (3)

- IR Issues
  - Vibration
    - Quadrupole vibration EM / SC / PM ↔ stability
      - Are compact SC quads OK for both NC and SC??
      - Measure vibration of SC quad (at nm level)
    - Solenoid stability
      - Couples to IR quadrupole (PM, what about SC??) and beam
      - Vibration; creep; field stability
    - Other effects
      - Crab cavity – do we need a demonstration?
      - Intra-train feedback?
  - Instrumentation / backgrounds
    - IR is a horrible environment!
      - SR; beamstrahlung; pairs; lost primary particles; electron/ion from gas
    - Instrumentation is essential for luminosity
      - Will it work? What needs to be tested? What will really be measured at startup when the beams are a mess?

R&D Issues WG3 & 4 (4)

- IR Issues (2)
  - Optics predictions and codes
    - Discussed yesterday!
    - What needs to be tested – anything??
    - New FFS?? Nonlinear collimation??
      - Be nice but not necessary.
  - IR engineering studies
    - This is the topic for Thursday morning but ….
    - What needs beam? What does not? Stand alone vs. system
    - Everybody seems at least partially interested in stabilization
    - Possible test areas:
      - LINX (SLC FFS); new FFS; nonlinear collimation; colliding beams for very accurate position determination; difficult isolation problem
      - AFT2: very low emittance beams at low energy; get to start over and build right but cost ??
      - Others??