Input of WG1

Beam and Luminosity Parameters (2)

- Likely can have 5640 bunches at half-distance
- Can have 150um bunches
  - Can add up to 2*0.5km of tunnel length
  - Leads to tighter tolerances
  - Need to find out if 150um is better due to lower disruption

Parameters Cont. (2)

- Do not know if we can meet luminosity target in a realistic environnement
  - Static beam-based alignment and tuning of bunch compressor, beam delivery system, main linac is in better state
  - Feedback studies are ongoing
    - Will give tolerances for different parameters
  - Study of alignment and tuning with dynamic machine
    - Will give tolerances for different parameters
  - Benchmarking of simulations is essential

Initial Gradient (3)

- Prefer high gradient from very beginning but can likely accomodate low gradient

Energy Upgrade Path (4)

- Damping ring injects into first part of tunnel:
  - Bunch compressor must be imediately before main linac
  - Prefer linac in first part of tunnel
    - Low-energy 6mm bunch vs high-energy 300um bunch transport
    - Could do both, prefer high energy transport
    - Would need to move bunch compressor if second half of the tunnel is filled first
    - Allows for different lattices at beginning and end of linac (if we choose such a lattice)
- Damping ring injects into second part of tunnel
  - No consensus sofar

Straight Tunnel (4)

- Can follow curvature of the earth
- But would prefer not to if comparable price

Positron Source (8)

- Undulator affects primary beam
- Would like to understand its impact

Damping Ring Location (10)

- The transport line is likely OK
- But would like to minimise low energy transport line length

Cavity Shape (11)

- Higher short-range wakefield in low loss design will yield some larger emittance growth but may not be too important (to be verified)
  - Cost savings because of shorter linac may allow for better instrumentation maybe yielding better performance with low loss cavities
- Long-range wakefield effects need to be studied

Implication of Ground Motion (new)

- Should be added as critical choice since it can have significant impact on performance or cost
- Integrated Studies will tell how much motion we can tolerate
- We can mitigate problem by stabilisation or more complex tuning but this costs

Bunch Compressor Layout (18)

- Need to evaluate the existing ones
- For 300um one-stage would be sufficient
- For 150um two-stage is required
- We prefer two-stage, even for 300um because otherwise there is no margin

Turn-Around after Damping Ring (26)

- It will help to reduce beam jitter by feed-forward
- In particular bunch-to-bunch jitter
- Strongly recommended

Bypass Line for Low Energy Running (27)

- Seems not necessary
  - Continue to study, in particular longitudinal plane
  - Mainly an RF problem
    - Ability to minimise bunch-to-bunch energy variation

How Many Diagnostics Stations in the Main Linac (29)

- One before, one after (+one before bunch compressor)
- Did not study how many inside
- Need to agree on a criterion first

MPS Design (33)

- We need to study this much more

Tail Folding Octupoles (35)

- We recoomend to put them in
- But the design should be made not to rely on it

Use Structure BPMs (36)

- Most likely to be useful
  - In the bunch compressor
  - In the low energy end of the linac
  - In the case of LL or RE cavities
  - If cryomodules are equipped with movers
- Tilt measurement would be very useful
- Can’t quantify the benefits yet

Collimation Strategy (37)

- Always need energy collimation after betatron
  - Clean up scattered particles at low energy
- Obvious MPS issues in either case!
- Higher tolerance for energy absorption in collimators == larger betafunctions
  - We prefer smaller beta functions thus would prefer to minimize energy absorption tolerance
- Pre-linac collimation is vital

Final Focus Strategy (40)

- WG1's opinion:
  - We don't have a dog in this fight
  - Except we find a problem with the tuning

Main Linac Lattice (41)

- Working lattices exists
  - Start at about 24 cavity spacing
  - Can live with any module length
- Option to weaken focusing in high energy end to save some money
- Hints that we can weaken focusing even in low-energy end
  - Studies ongoing
- Different optimum for LL RE
- Split tune (75/60 or more) required for rotating modes

Position of Quadrupole in Module (42)

- Separation of RF and quadrupoles seems useful
  - Possible reduction in quad vibration
  - Simplifies use of HOM BPMs and movers on cryomodules if we go that way

BPM Type (43)

- Do not anticipate needing full bunch to bunch readout in most parts of LET
  - Implies we should use cavities except for a few places
  - A few high bandwidth BPMs will be required (maybe in the warm part)
- Can somebody quantify the resolution vs bandwidth tradeoff?