Summary

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FNAL Mini-Workshop
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- To be done

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- Average arc beam dimensions: $\sigma_y = 0.7$ mm $\sigma_x = 4$ mm
- Open mid-plane magnets appear technically plausible
  - Design with AlBemet supports appear ok
  - Design with no downward forces on lower coils appear ok
- But their shielding is less effective than expected
  - approx 20% of beam power end up at 4 deg (cf needed suppression below 1%)
  - more energy transported vertically than expected
  - this is seen even in the absence of tungsten absorbers
  - it is not understood
- But thick tungsten pipe shield still looks promising
  - shield can be elliptical thus reducing total mass
  - an elliptical cos theta dipole could fit closely over the pipe
  - but design needs study

To be done

- Investigate mechanism of vertical energy flow
  - MARS sim. of simple fully open dipole NOTE 1 (Kirk, Ding)
  - simulate above with particle tracking (Alexahin, McIntyre ?)
  - use backtracking to find source (Mokhov)
  - consider other geometries (Gupta)
- Study tungsten pipe option
  - define plausible elliptical shield dimensions NOTE 2 (Palmer)
  - run MARS on above pipe geometries at 750 GeV (Mokhov)
  - preliminary elliptical cos theta dipole design (Tompkins)
- Plan Friday presentation in 2-3 weeks
- Plan Telluride session
- Consider SBIR phase I on elliptical pipe solution

NOTE 1 on simple open dipole

- Compare uniform By with real
- No tungsten rods, fully open
- Black holes left and right to see energy flow
- Initial muons with & without emittance
- Vary gap h=1.5, 3, 6 cm

NOTE 2 on elliptical pipe solution

- Set cryo wall power = 10 MW
- Beam power to electrons 2.5 MW
- Absorber with radial thicknesses to give symmetric penetration
- 1 cm gap between absorber and coil inside
- Beam pipe: $\pm$ 1 cm vertical, by $\pm$ 2.5 cm horizontal

THANKS JOHN