

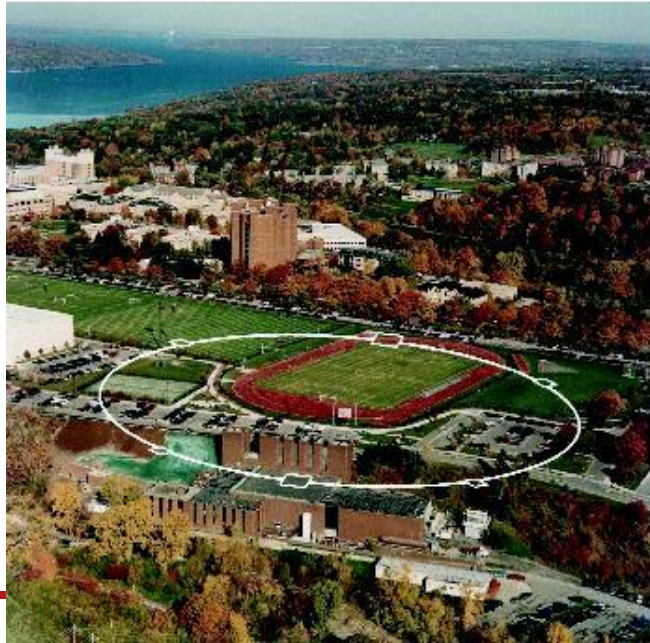


Cornell Laboratory for  
Accelerator-based Sciences and  
Education (CLASSE)

# DR Vacuum Component Overview

*April 25, 2012*

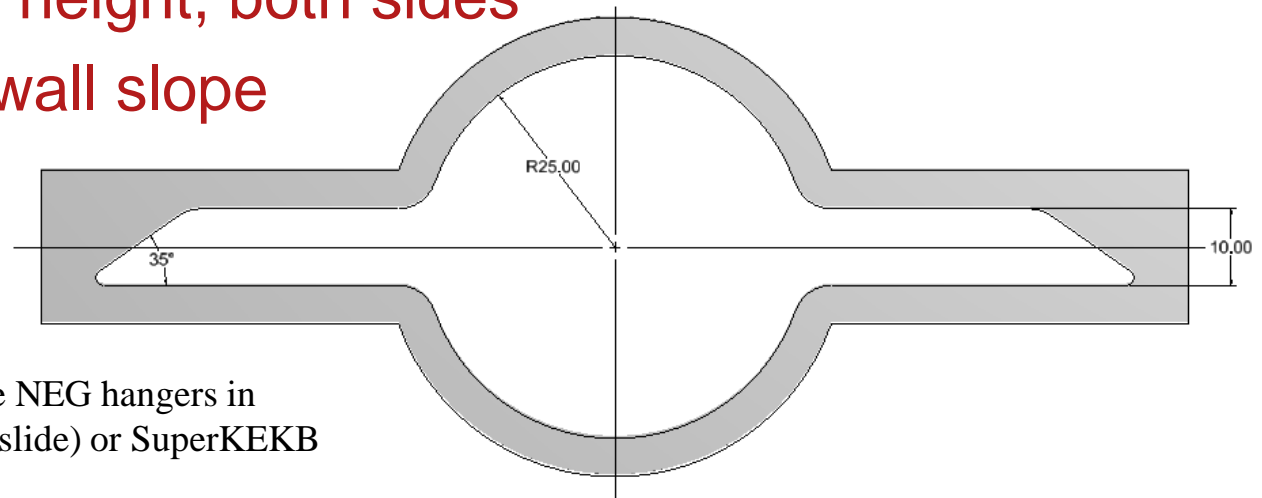
Joe Conway





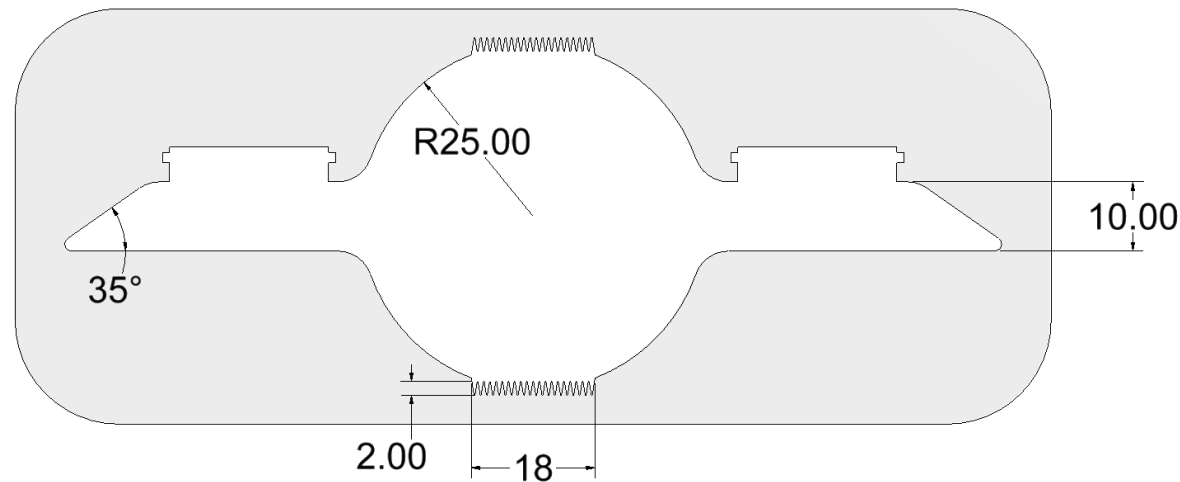
- 4 basic vacuum chamber types
  - Antechamber (Arcs)
  - Grooved Antechamber (Arc Dipoles, Chicane)
  - Wiggler
  - Straight
- Straight chamber: round Al extrusion with TiN coating and solenoids. 50mm inner diameter
- Sliding joints and BPMs taken from RDR

- Aluminum extrusion, TiN Coated
- Dual antechamber
- Sloped Antechamber walls
- Used in Arcs and Chicane
- Grooved version used in all dipoles
  
- 50mm main chamber diameter
- 1cm Antechamber height, both sides
- 35° antechamber wall slope

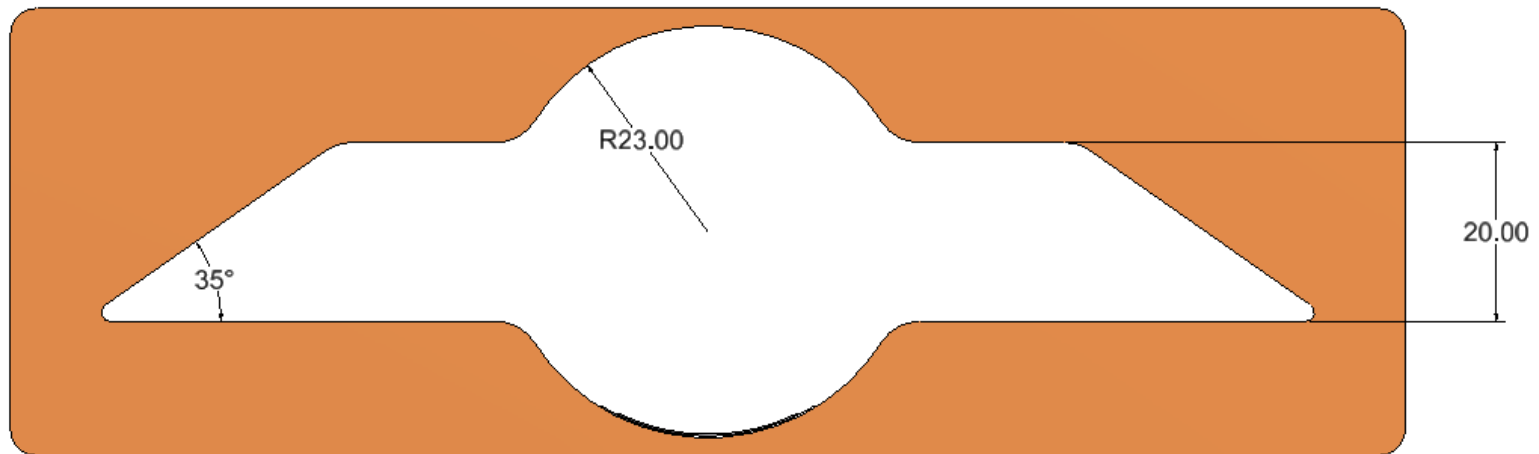
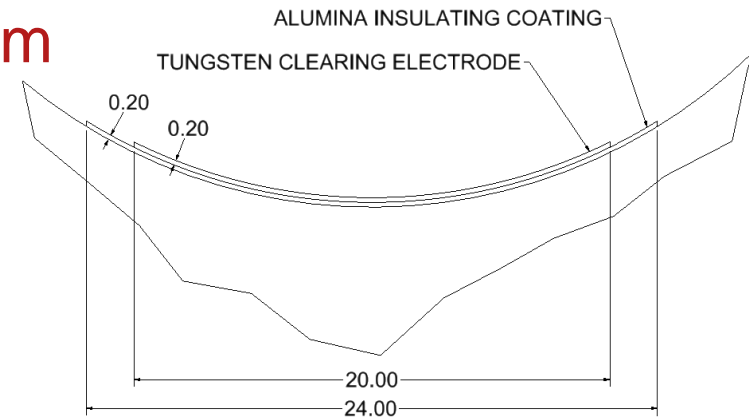


Could use ERL style NEG hangers in  
antechambers (next slide) or SuperKEKB  
style maybe

- Aluminum extrusion, TiN Coated
- Used in Dipoles in Arcs and Chicane
- 50mm main chamber diameter
- 1cm Antechamber height, both sides
- 35° antechamber wall slope
- 20 grooves top and bottom
- 2mm height, 18° opening angle
- Shows Cornell ERL style NEG hanger locations



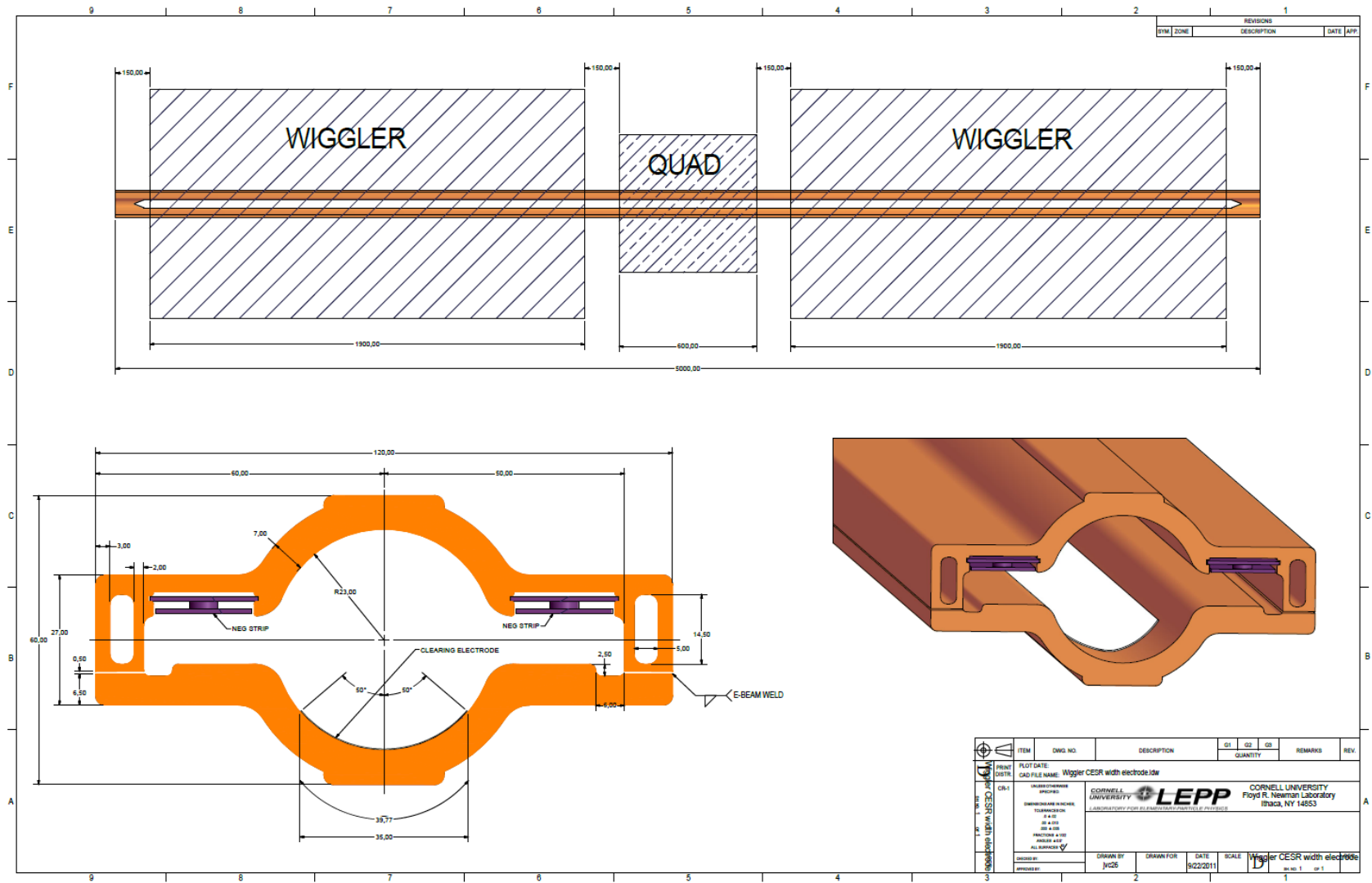
- Copper Extrusion
- Tungsten clearing electrode on bottom
- 46mm main chamber diameter
- 2cm tall antechambers both sides
- 35° antechamber wall slope



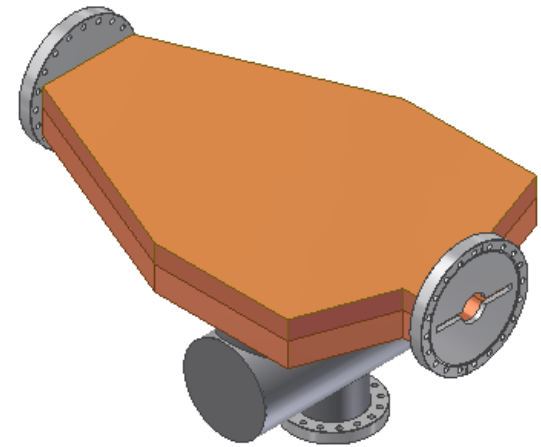
- TiN coated AL extrusion with same inner dimensions used in Wiggler section drifts



# Additional Wiggler Chamber Drawing



- Photon stops based on RDR Design
  - 0.76m long
  - Dedicated ion pump + TiSPs?
- Large photon stop in first bend at end of Wiggler straight in first bend
  - Prevents photons from wiggler straight reflecting down the arc
- Ion Pumping and vacuum chamber end treatments same style as ERL concepts
- CF flanges with reusable RF inserts inside CF gasket similar to ERL style





- Wiggler Chambers
  - Box extrusion in copper probably not possible, specially with NEG hanger details
  - Should cost as if machining chamber out of solid copper block
  - Unlikely to need angled walls in antechamber section due to photon stops preventing photons from striking outer antechamber walls.
  - NEG strips should be recessed further into chamber to prevent RF heating
  - Weld on cooling channels after thermal spray and e-beam welding chamber halves together
- Need cooling detail and distributed pumping detail in all vacuum chambers
- AL-SS bonded transitions at ends of every chamber? Use AL flanges? Regional differences
- Gate Valves in Wiggler straight?