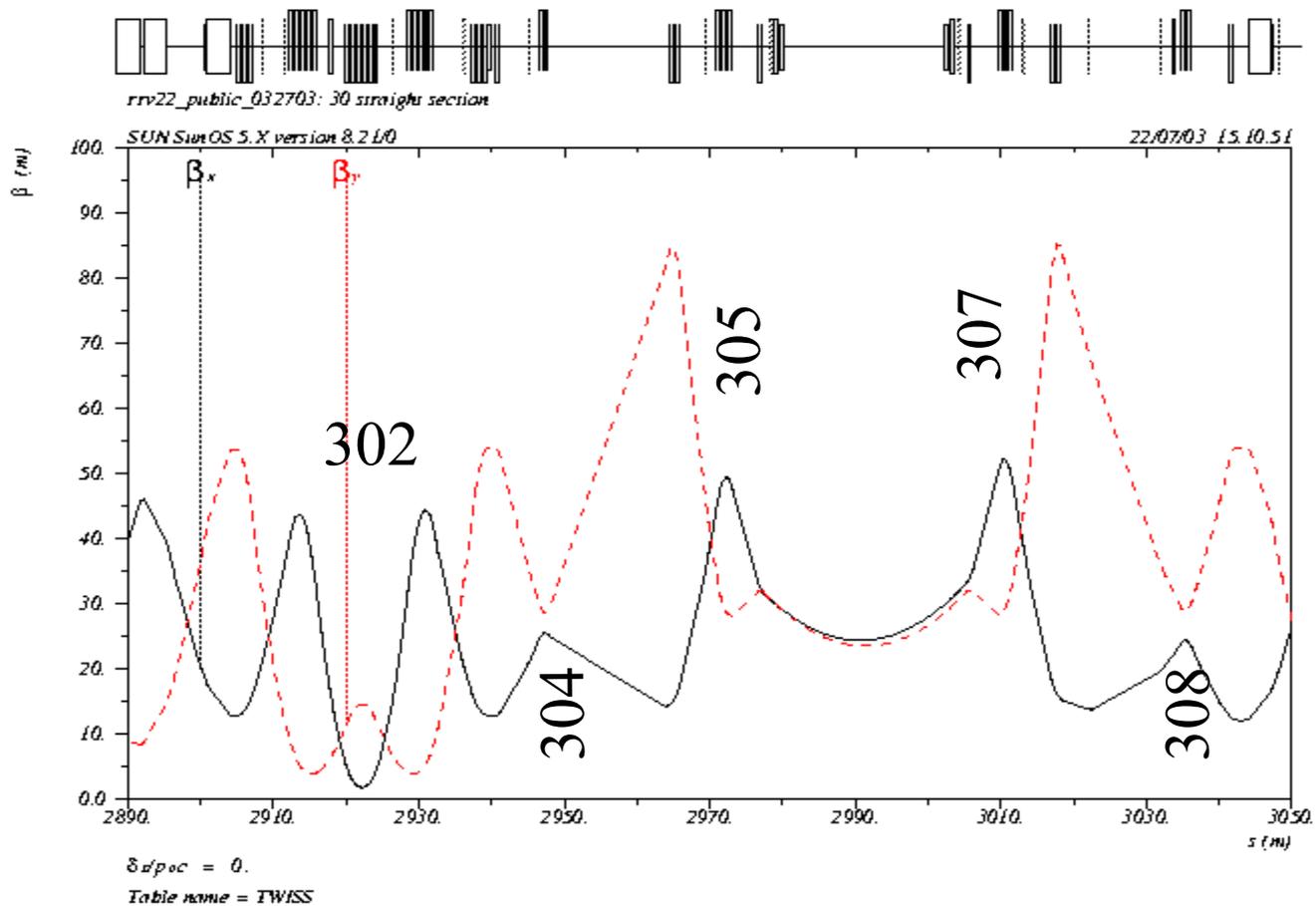
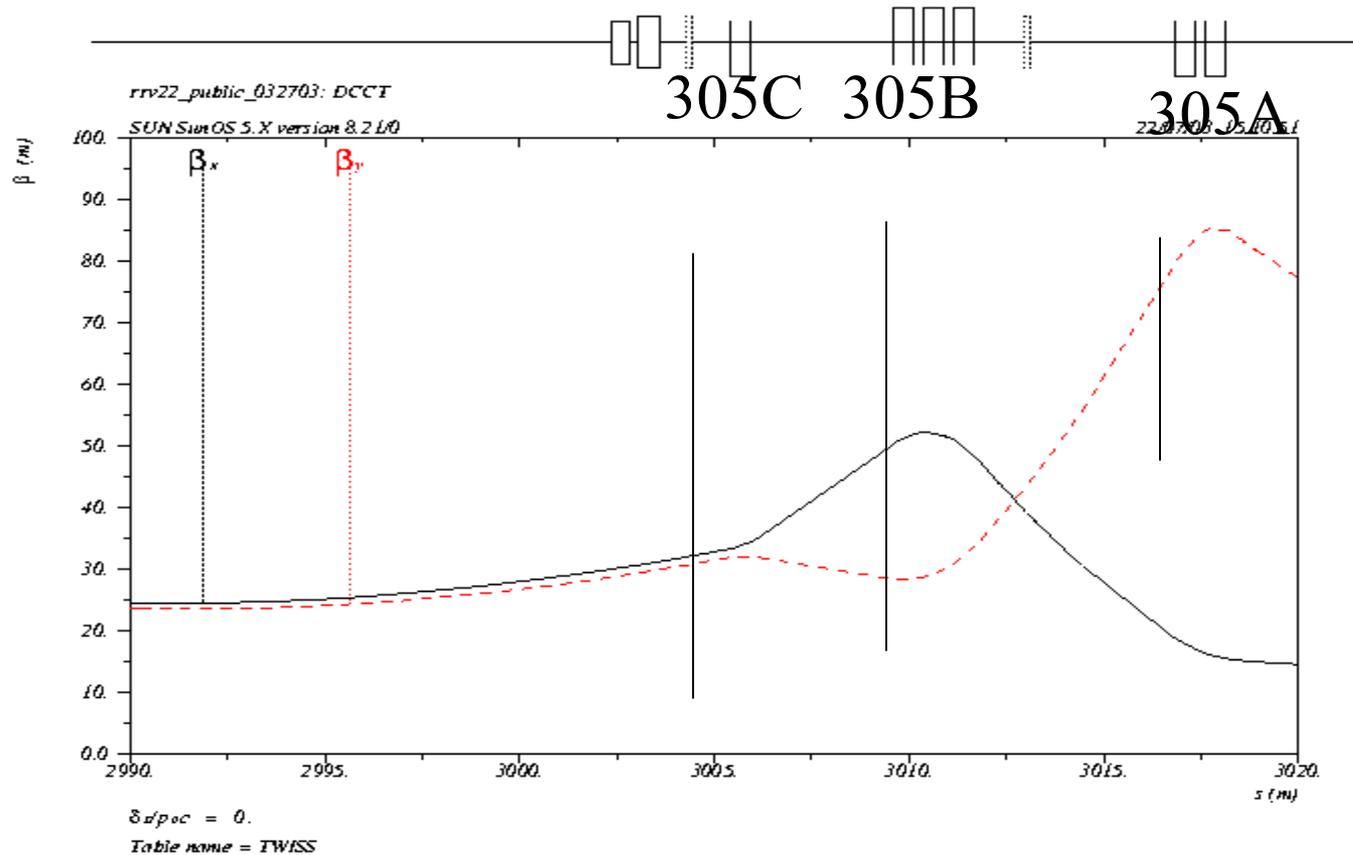


# Recycler 30 Straight Lattice



# Half ECOOL Insert



# Admittance

- Admittance given  $A = \pi (\gamma\beta) a^2/\beta$  [ $\pi$ -mm-mr]
  - where  $a$  is the physical half aperture and  $\beta$  is the local beta function, and  $\gamma\beta$  normalizes to 8 GeV (9.47)
  - In arc cells  $b(\max) \sim 55$  meters and the ID aperture of the beam pipe is 3.75” horizontal and 1.75” vertical
  - Physical admittance  $A_h = 390 \pi$ -mm-mr and  $A_v \sim 85 \pi$ -mm-mr
  - Measured Admittance  $\sim 50 \pi$ -mm-mr in each plane
  - The absolute minimum dimension of beam pipe that would not reduce the vertical aperture is
    - $a^2 = (0.875)^2 (30/55)$
    - $a \sim 0.65$ ” or 1.3” diameter (32.8 mm diameter)
  - This is not the recommended aperture ! Only the minimum aperture needed to maintain the vertical admittance.
  - This assumes we will have beams of equal emittances

# Cooling Tank Admittance

- Aperture of cooling tank pick up and kickers is 1.65” (42mm) and max b is 40 meters gives us an admittance of  $105 \pi$ .

# Beam Sizes

- Beam sigma for a 95% normalized emittance,  $\varepsilon^n$  is given by  $\sigma^2 = \varepsilon^n \beta / 6(\beta\gamma)$ 
  - Assume emittance of  $40 \pi$ -mm-mr and  $\beta$  in cooling insert of 30 meters, then  $\sigma = 4.6$  mm
  - Then,  $\pm 3\sigma = 27.6$  mm as compared to 32.8mm (on previous slide)
  - For  $10 \pi$  beam  $\pm 3\sigma = 13.8$  mm