repeated for 2 seeds but only the results concerning seed 0 will be described here since the differences between seeds, as already remarked, are minimal.
Figure 2a, 3a and 4a contain the smear plot surfaces for Scenario 1 for $\Delta p/p$=+0.11%, $\Delta p/p=0$ and $\Delta p/p$=−0.11% respectively; the corresponding contour plots (Figure 2b, 3b and 4b) are also shown together with the coupling resonance. It can be noticed that the phase space area affected by the coupling resonance also exhibits large smear variations. The largest effect on the smears happens for $\Delta p/p$=-0.11% when a relatively large area of phase space is affected by the coupling resonance. That is in accordance with the results obtained for the tunes in Figure 1 (upper left plot) where the larger amplitudes appear to approach the coupling resonance.
Figure 5a and 5b, 6a and 6b describe respectively Scenario 2 and 3 for the case $\Delta p/p$=−0.11%: the linear aperture is improved with respect to Scenario 1 in both cases, and the differences between Scenario 2 and 3 are marginal, also this in accordance with the results obtained in the tune space.
A comparison between the horizontal smear and the region of (a_x,a_y) space used to generate tuneleaf plots is shown in Figure 2c, where lines of equal smear are broken and lines used for the tracking grid are solid. Also shown is the aperture determined with 1 million turn tracking runs using initial coordinates corresponding to equal action in the horizontal and vertical planes. The aperture limit of 12σ, where $\varepsilon_{tot}=(12\sigma)^2/\beta^*$ is located at the edge of the region where lines of equal horizontal smear become irregular. The lines of equal smear and the radial lines of the grid used to generate the tuneleaf plots are roughly parallel. The fact that small amplitude particles have large smear is thought to result from the normalization used in the smear functions. The current smear plots compare regions where smears are simple functions of the amplitudes and nonlinear phase space regions where the smears are more complicated.

5. New dipoles

Currently five dipoles, DRG101, DRG102, DRG103, DRG104, and DRG111, have been received. Warm measurements supplied by Grumman list average values $\langle b_2'(W)\rangle$ =3.20 and $\langle b_4'(W)\rangle$ =−0.75. Using Table 3 and Table 4 to adjust warm multipoles to 660 and 5000Amps, one obtains the anticipated average multipoles listed in Table 8. The $\langle b_2'\rangle$ is small at injection and storage. The $\langle b_4'\rangle$ lies between the “present” and “phase1” values and should produce tune spreads between that of scenario 1 and scenario 2 in Figure 1.

Table 8: Average body multipoles for 5 dipoles. Warm measurements converted to 5000 A with DRG101 data.

	660 A	5000 A
<b2’>	+0.02	−0.27
<b4’>	−1.21	−0.65

6. Conclusion

The tuneleaf and smear plots indicate that tuneshifts and smears from Scenario 1 (called “Present” in Ref[1]) may be unacceptably large at dp/p=+0.11%. Either Scheme 1 (Scenario 2) in which the midplane cap is reduced by from 0.006” to 0.004” or Scheme 2 (Scenario 3) in which only wedge #2 is changed, produce tune dependence similar to that shown for the baseline lattice. Either of the latter two solutions give acceptable results. The selection should therefore be based on different considerations.

Bibliography

[1]R.Gupta, RHIC-MD-237, May 27, 1994

[2]“Multipole Tables: EXPECTED-Q8.TABLE1-D, EXPECTED-Q13.TABLE2-D,
EXPECTED-D8.TABLE3-D, EXPECTED-D10.TABLE4-D,