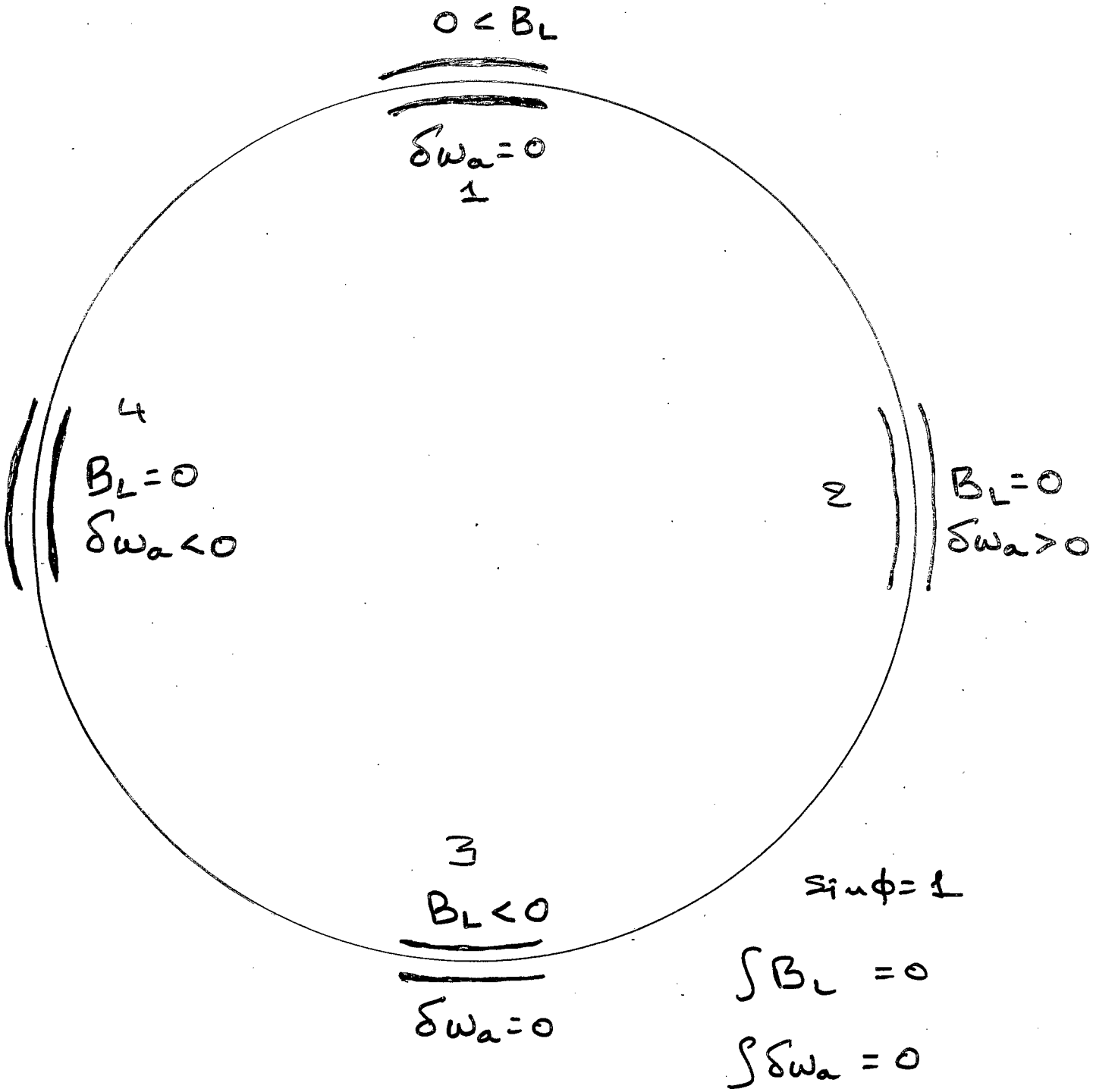
A method to minimize the Twist & Saurer Effects.

12/11/2003
YKS



$\sin\phi = 1$

$\int B_L = 0$

$\int \delta\omega_a = 0$

From Yuri's presentation @ EDM collaboration (BNL, 13 Nov 2003):

$$(\eta_d)_{false} = \left(\frac{\delta\omega_a}{\omega_c}\right)\frac{\sin\phi}{K\beta\gamma}\,\vartheta_L$$

$$\vartheta_L = \frac{B_L}{B_0}$$

$$d_d = \eta_{Ld} \times 2.7\times10^{-15}\ e\cdot cm$$

i.e. $(\eta_d)_{false} < 4\times10^{-13}$ for $d_d = 10^{-27}\ e\cdot cm$

$$\Rightarrow \vartheta_L\,(\delta\omega_a/\omega_c) < 2\times10^{-13} \text{ and for } N=32$$

$$\Rightarrow \sqrt{\overline{\vartheta_L^2}} \oplus \sqrt{\overline{\delta\omega_a^2/\omega_c^2}} < 0.7\times10^{-11}$$

$$\Rightarrow \sqrt{\overline{\vartheta_L^2}} = 10^{-5} \;\&\; \sqrt{\overline{\delta\omega_a^2/\omega_c^2}} = 10^{-6}$$

would do it.

The suggestion is to make the local $\delta\omega_a$ larger by $> 10^2$ while keeping $\Sigma \delta\omega_a = 0$ around the ring.

- @ 1+2 use $E = 90\% E_c$

  @ 3+4 " $E = 110\% E_c$

  move magnets or current shimms so that B_L is minimized

- Repeat w/ 1+3 @ $E = 90\% E_c$

  2+4 @ $E = 110\% E_c$

  and so on to correct <u>all</u> modes of ring.

- Use protons to do this. Key issue is STABILITY w/ time.