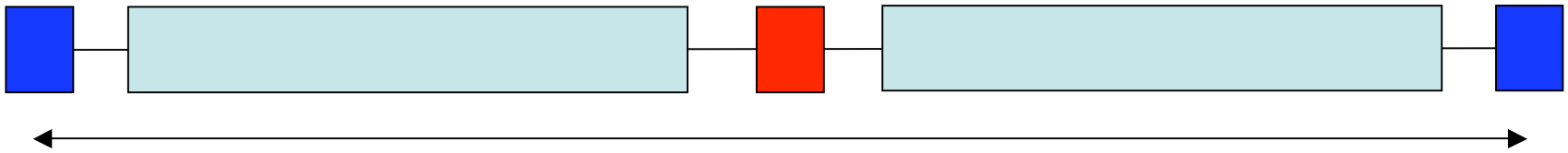
Transverse IBS in RHIC

The main contribution to the transverse IBS in RHIC come from the arcs, most of which comprised of FODO cells

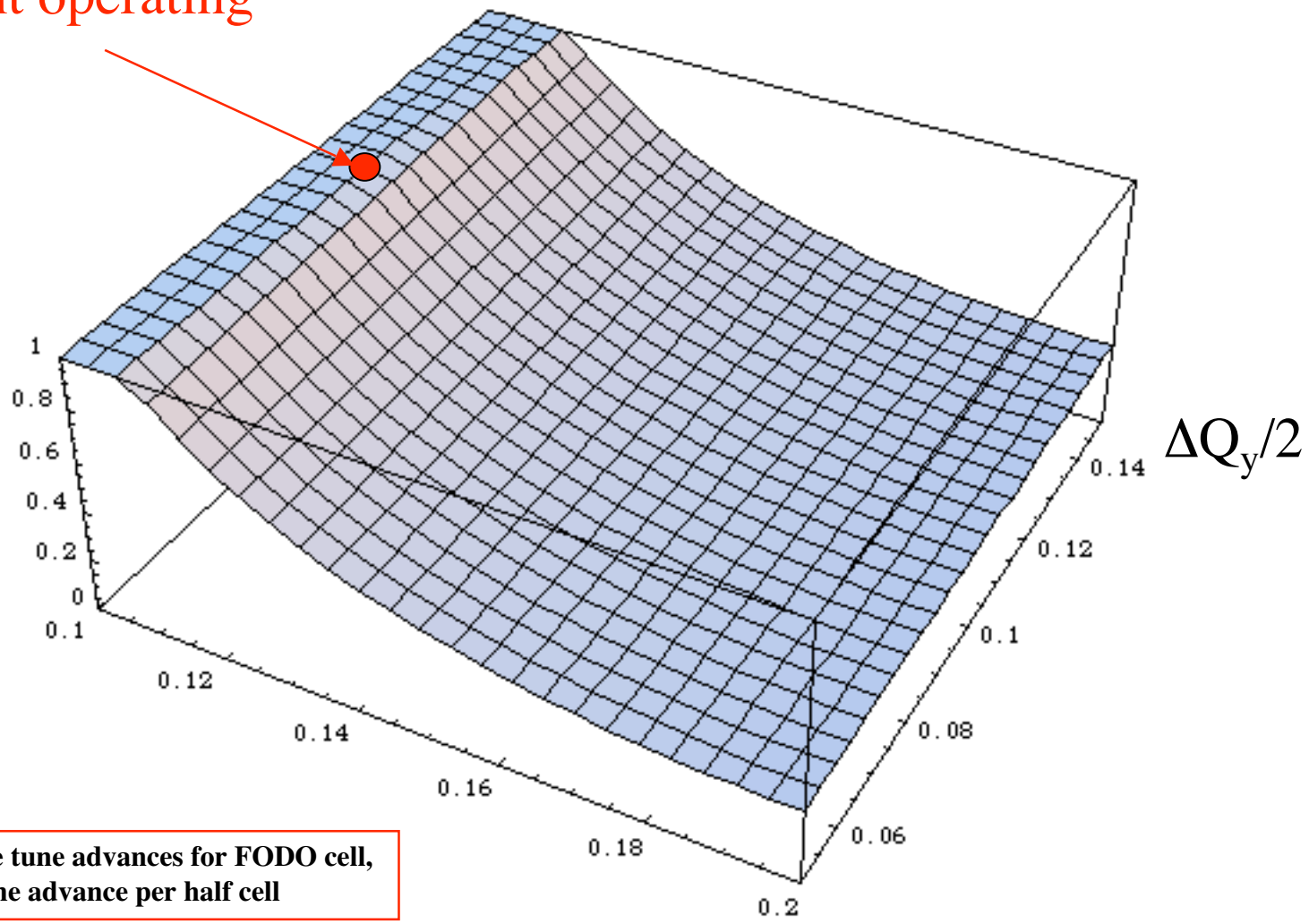


$$\frac{d\varepsilon_x}{ds} = H(s)\cdot\frac{d\delta_E{}^2}{ds};\qquad H(s)=\gamma_x D_x^2 + 2\alpha_x D_x D_x{}' + \beta_x D_x{}'^2$$

- The arcs quadrupoles are set well below their limit: operate at ~4-4.5 kA,
- PS are capable of 5.6 kA, leads can stand 6.3-6.5 kA, quench limit is at 7 kA.

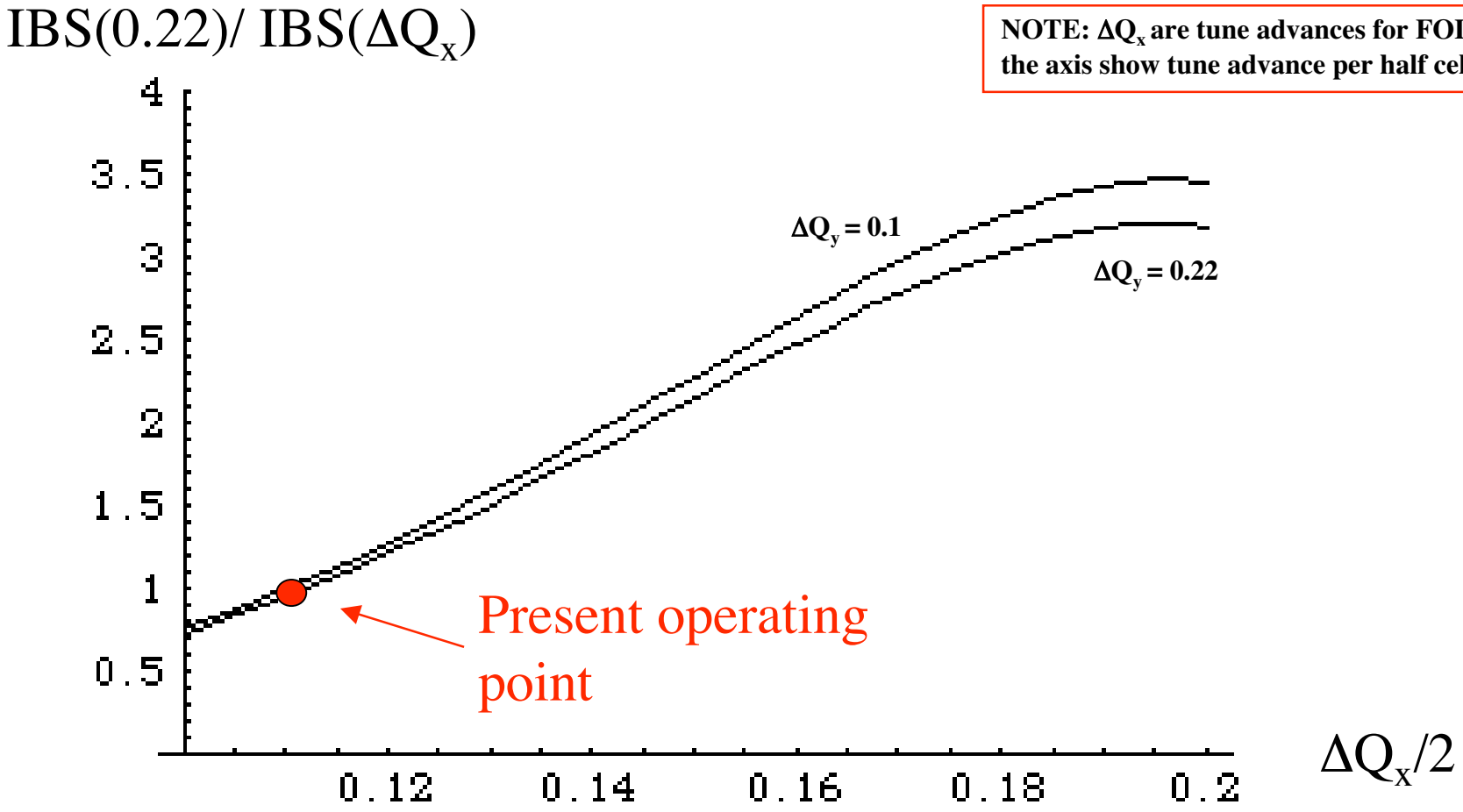
Transverse IBS rate in RHIC

Present operating point

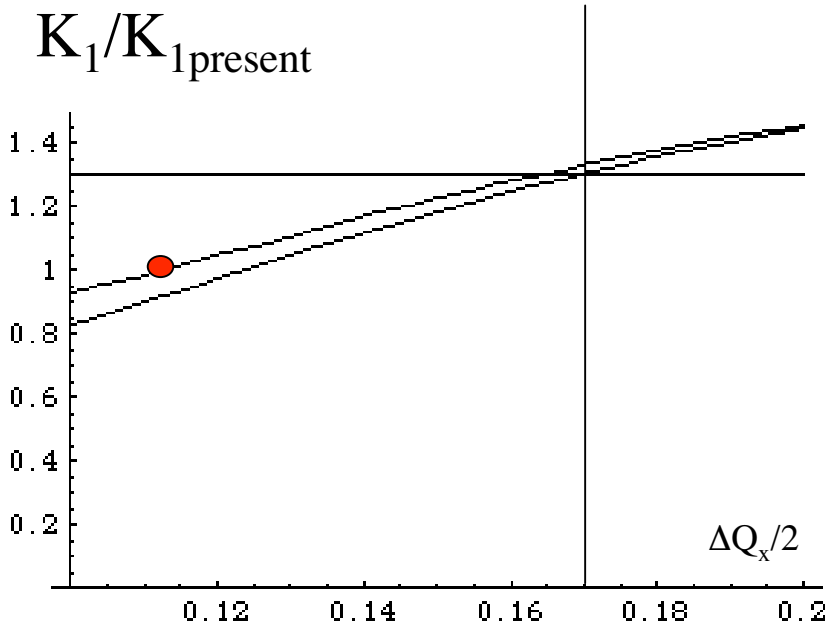


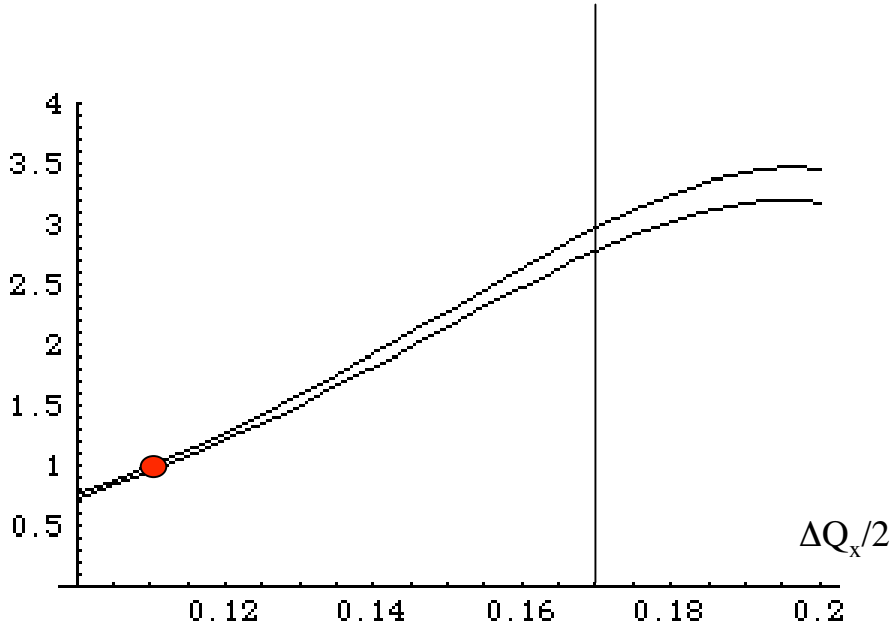
NOTE: $\Delta Q_{x,y}$ are tune advances for FODO cell, the axis show tune advance per half cell

Reduction of the IBS rate, i.e. increase of the luminosity lifetime



QF setting





NOTE: $\Delta Q_{x,y}$ are tune advances for FODO cell, the axis show tune advance per half cell

NOTE: ΔQ_x are tune advances for FODO cell, the axis show tune advance per half cell

Possible Limitations

- Power supplies, leads and quenching
- Current distribution limitations - H & V strings, the tree shunting PS…
- Sextupole strength
- Growth of γ_t and strength of γ_t quads
- Matching with desirable β^*
- Dynamic aperture
- Effects on coupling compensations scheme, diagnostics using specific tune advances, etc….