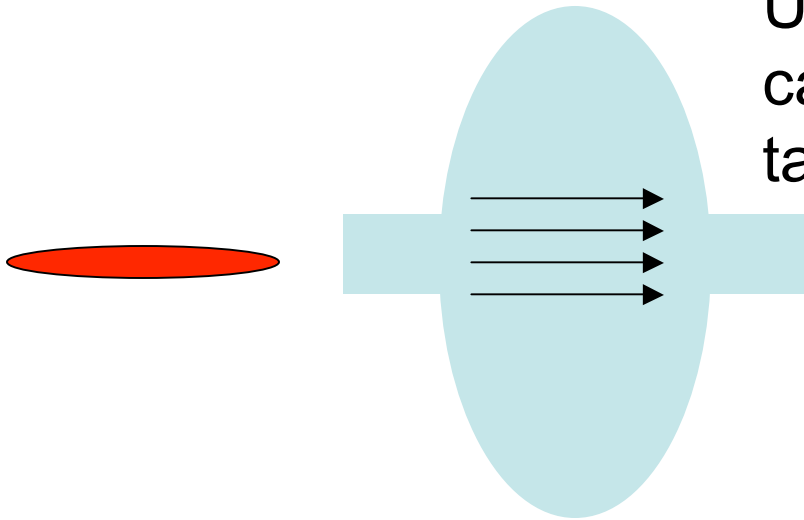


Dispersive Crabbing (G. Jackson)

Use energy chirp from accelerating cavity and dispersion to launch head-tail oscillations.



energy chirp

$$\Delta\delta = \frac{eV}{E} \sin(\omega_{rf}z)$$

Crossing angle $\Delta x = \eta\Delta\delta$

Transverse offset $\theta \approx 2\sqrt{\frac{\beta}{\beta^*}} \frac{\Delta x}{z}$

Required voltage/dispersion

$$V = \frac{Ec}{2\omega_{rf}\eta} \sqrt{\frac{\beta}{\beta^*}} \theta$$

LHC Example

$\theta = 0.5$ mrad

$\beta = 200$ m

$\beta^* = 0.5$ m

$f_{rf} = 400$ MHz

$\eta = 100$ m

$V = 40$ MV