

BLonD for FCC-ee

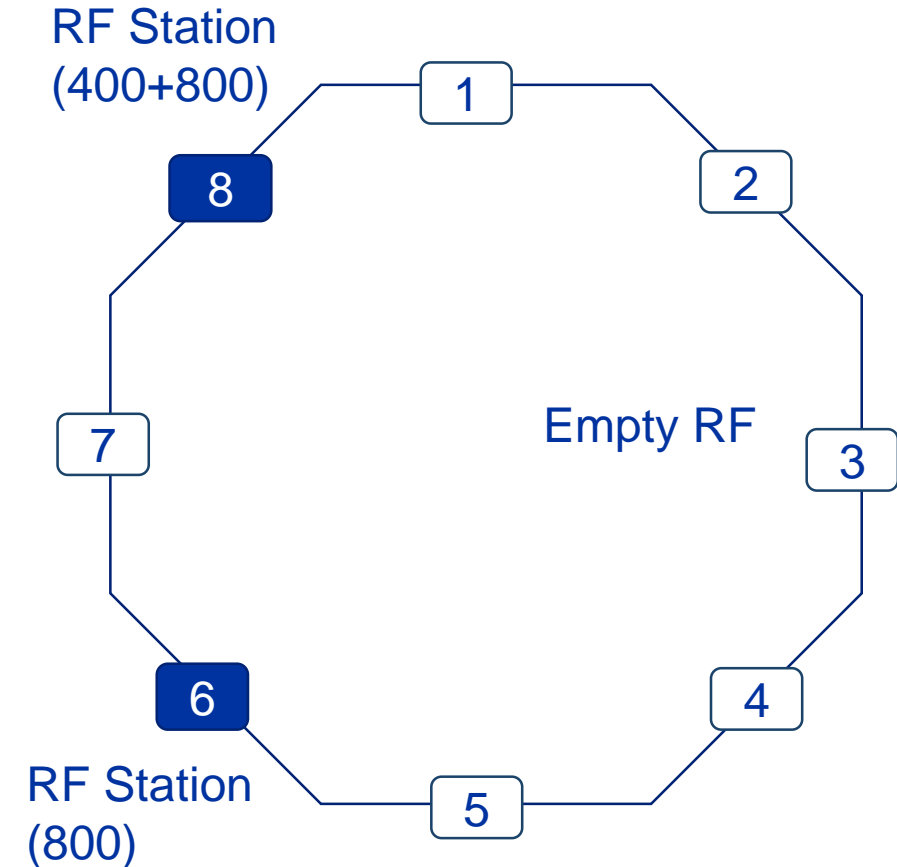
FCC-ee: study e+e- collisions

We will have **counter rotating beams** in a **common RF** system.

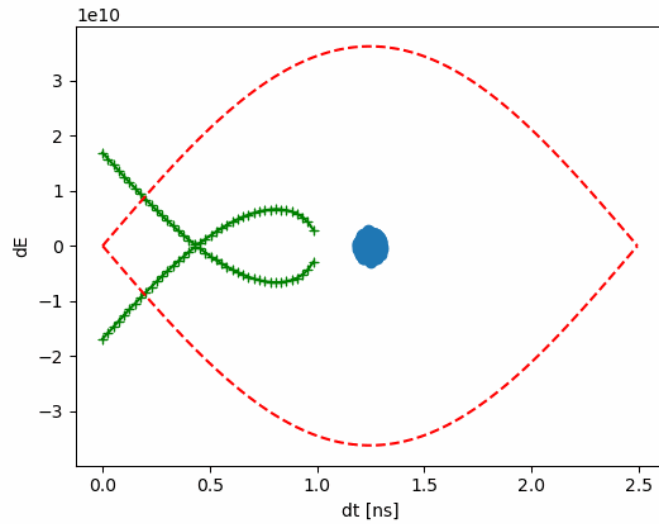
Machine **ttbar**: Sync momentum = 182.5 GeV \rightarrow high energy, strong SR: loss per turn (~ 9 GeV)

Start with single bunch (then multi-bunch ~ 50 for ttbar)

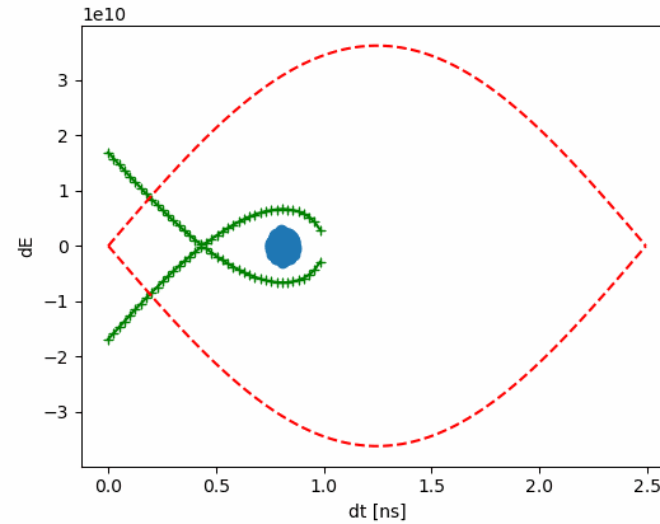
RF cavities layout for FCC:



Single section single RF

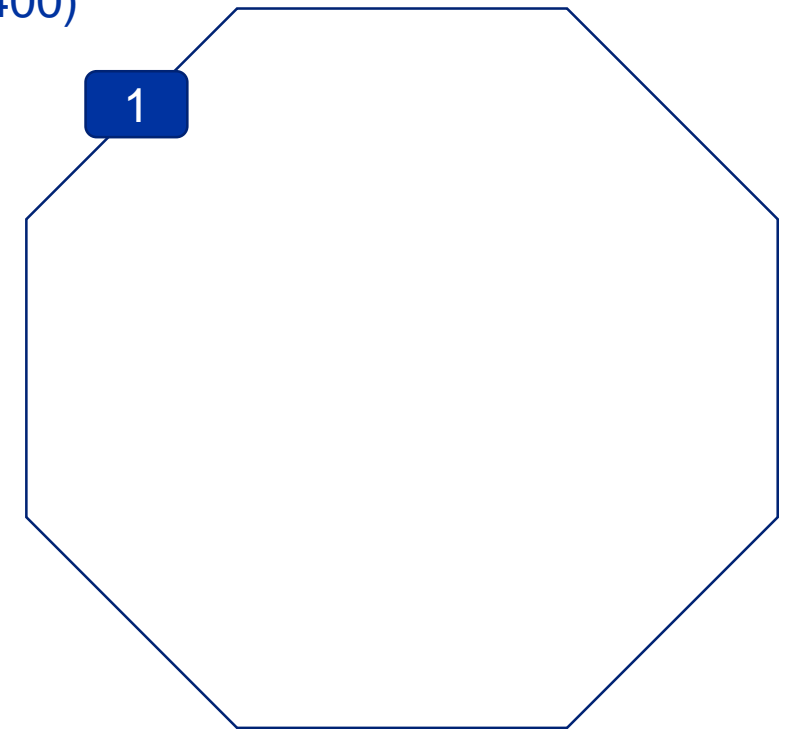


Without beam shift

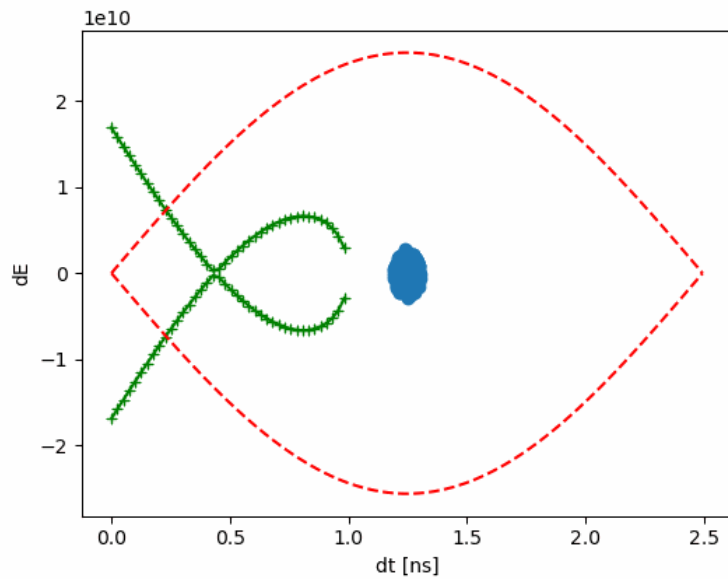


With beam shift

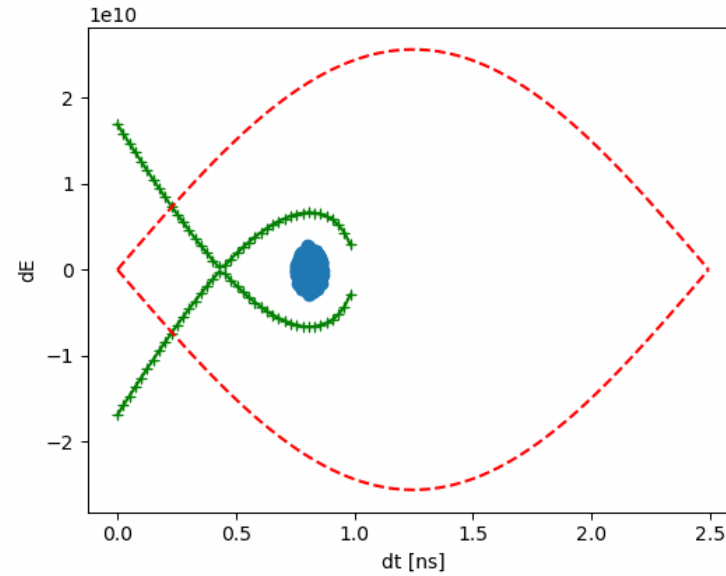
RF Station
(400)



Two sections single RF



Without beam shift



With beam shift

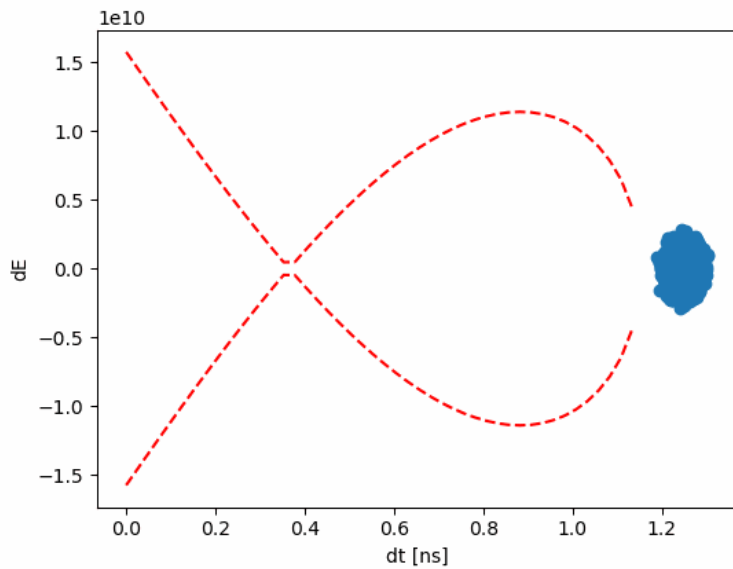
RF Station
(400 MHz,
 $V/2$)

1

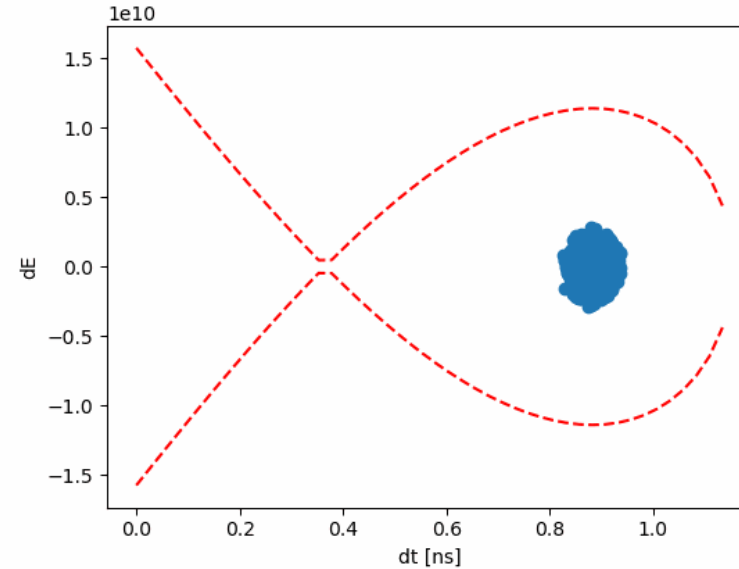
RF Station
(400 MHz,
 $V/2$)

2

Eight sections single RF

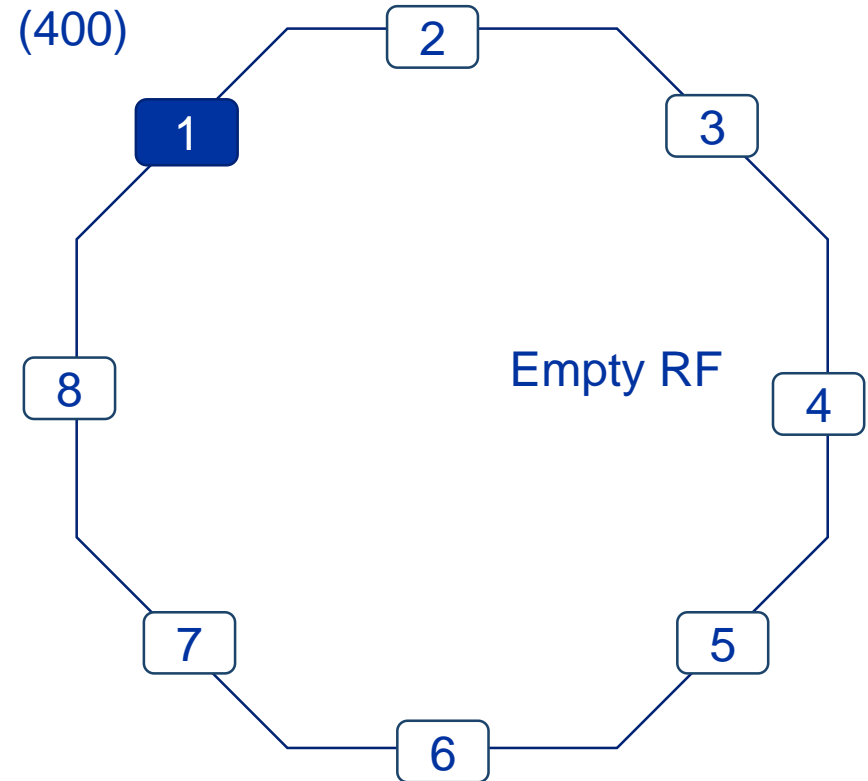


Without beam shift



With beam shift

RF Station
(400)



Synchrotron Radiation Tracking



CERN-ACC-NOTE-2017-xxx

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SR not part of tracking by default

Addition shift term can be added but:

- bunch generated unmatched → strongly affects instability studies
- only applicable to single RF

Modification of the simulation code BLoND for lepton rings

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How to move forward?

2. average
energy loss
per particle

4. quantum
excitation

$$\Delta E[n+1] = \Delta E'[n] - U_0 - \frac{2}{\tau_z} \Delta E'[n] + \frac{2 \sigma_{\Delta E}}{\sqrt{\tau_z}} E_s r,$$

1.kick

3. diff in
energy loss
per particle