Gamma/Electron Ratio and, Conparison of Small-CR and Large-CR

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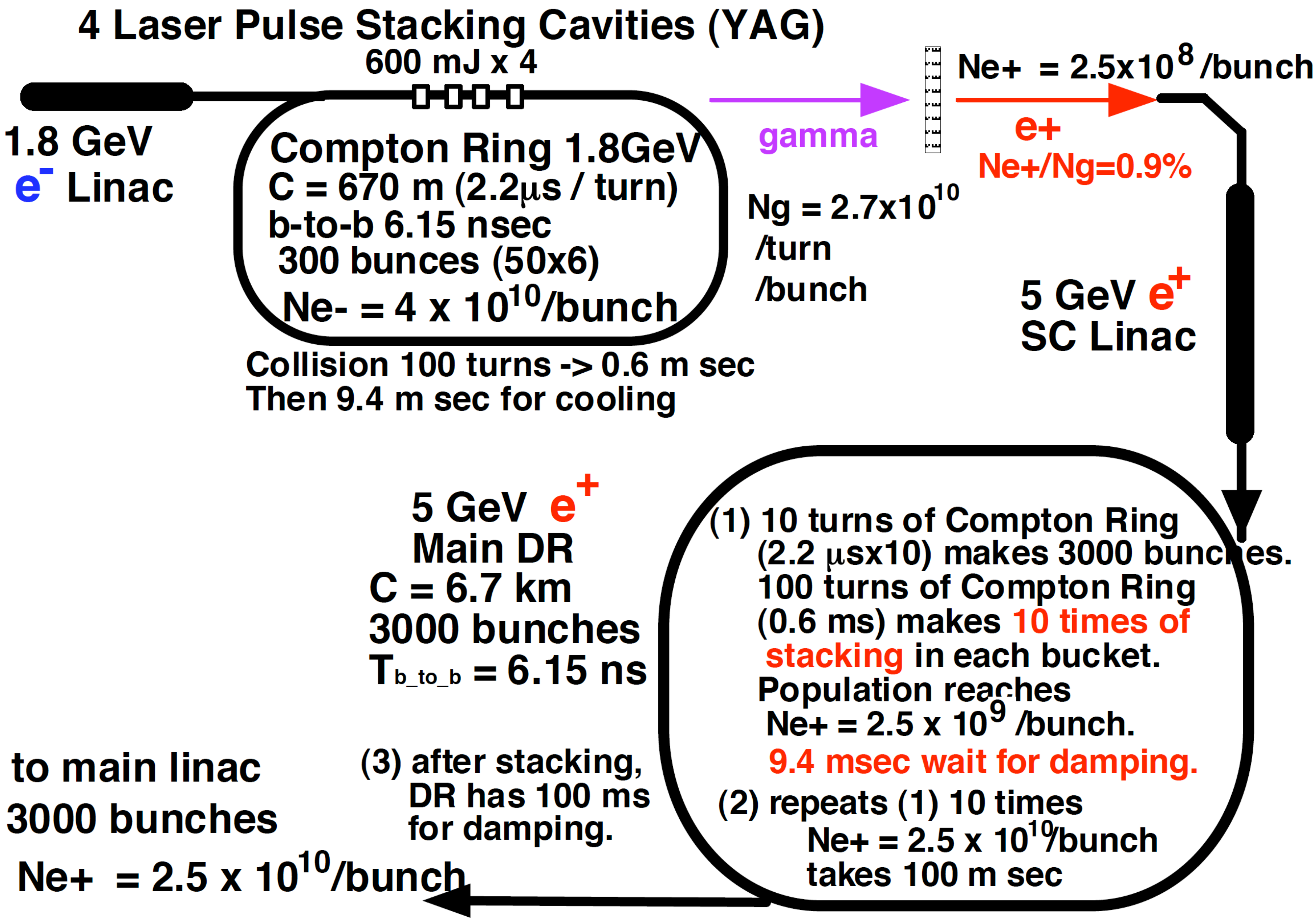
Compton Source for ILC (Small CR option)



Choice of CR circumference: Small CR or Large CR

$E_{spred\_}CR$ (just after single gen. cycle) = $(Ng\_cycle/Ne)^{1/2}$ x <Eg>

Small CR C = 670 m, Ee= 1.8 GeV <Eg> = 20 MeV

300 bunches in CR

CR 10 turn ---> create 3000 bunches

DR 10 stacking/cycle ---> CR 100 turn/cycle

Ne = 4×10^{10} /bunch

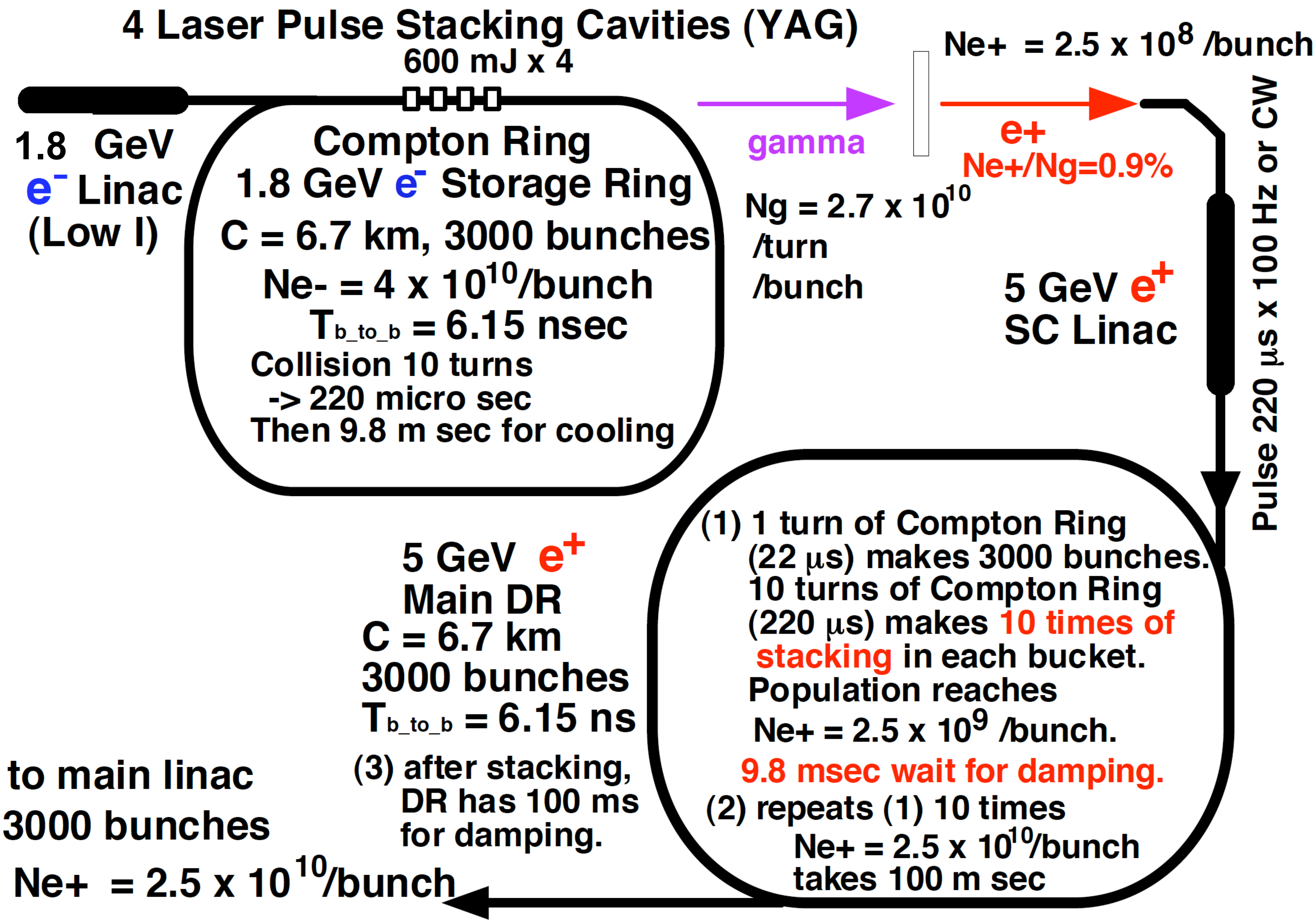
Ng_turn = 2.7×10^{10} (Laser : 600 mJ x 4)

$\{Ng\_cycle/Ne\}^{1/2} = \{(2.7 \times 10^{10}/4 \times 10^{10}) \times 100\}^{1/2} = 8$

$E_{spred\_}CR$ = 160 MeV too large!

---> small Ee, or , larger Ne and smaller laser E?, 2 micron laser, or, , ,

Compton Source for ILC (Large CR option)



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Large CR C = 6.7 km, Ee= 1.8 GeV <Eg> = 20 MeV expensive!

3000 bunches in CR put in DR tunnel?

CR 1 turn ---> create 3000 bunches

DR 10 stacking/cycle ---> CR 10 turn/cycle

Ne = 4×10^{10} /bunch

Ng_turn = 2.7×10^{10} (Laser : 600 mJ x 4)

$\{Ng\_cycle/Ne\}^{1/2} = \{(2.7\times10^{10}/4\times10^{10})\times10\}^{1/2} = 2.6$

$E_{spred\_}CR$ = 52 MeV acceptable?

---> small Ee is better?, larger Ne and smaller laser E?

Possible Cure

- Choose $T_{b\_to\_b}$ < 6.15 n sec,
  For example 2.05 n sec, Then we can put factor 3 bunches.
  RF kicker at injection to DR
  Laser collision every N-th bunch (N=3 in this example)

- Other Cure?