Undulator based positron source for CLIC 500GeV Ecm stage

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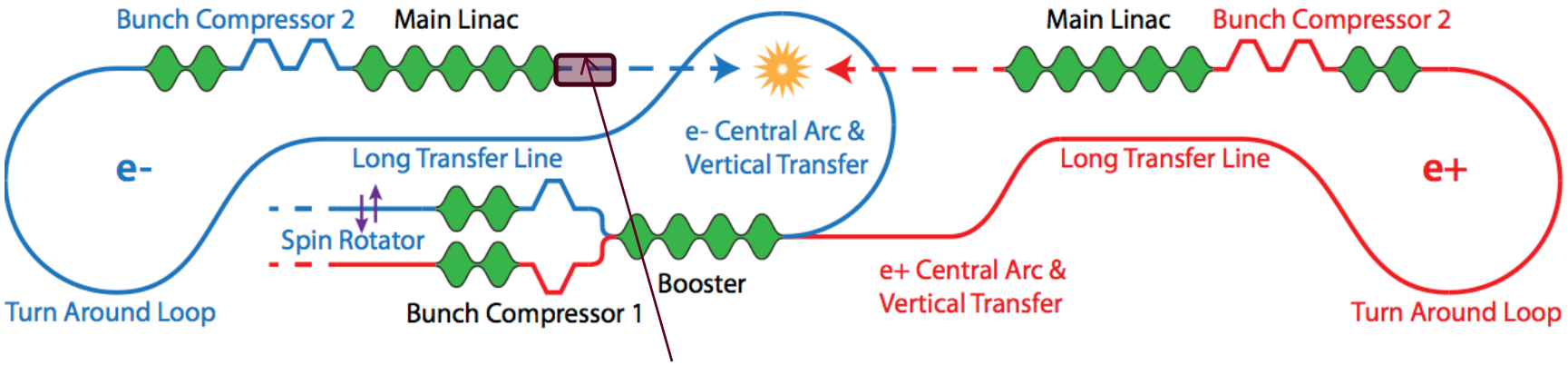
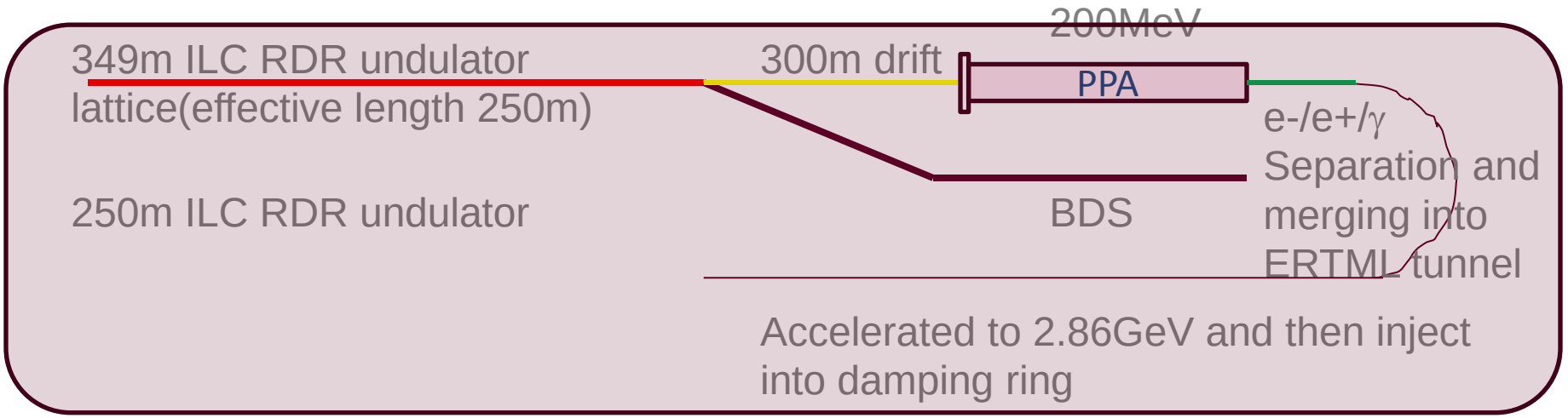
Motivation

- Try to sketch an undulator based positron source for CLIC with more detail
- Merge the positron source efforts between ILC and CLIC

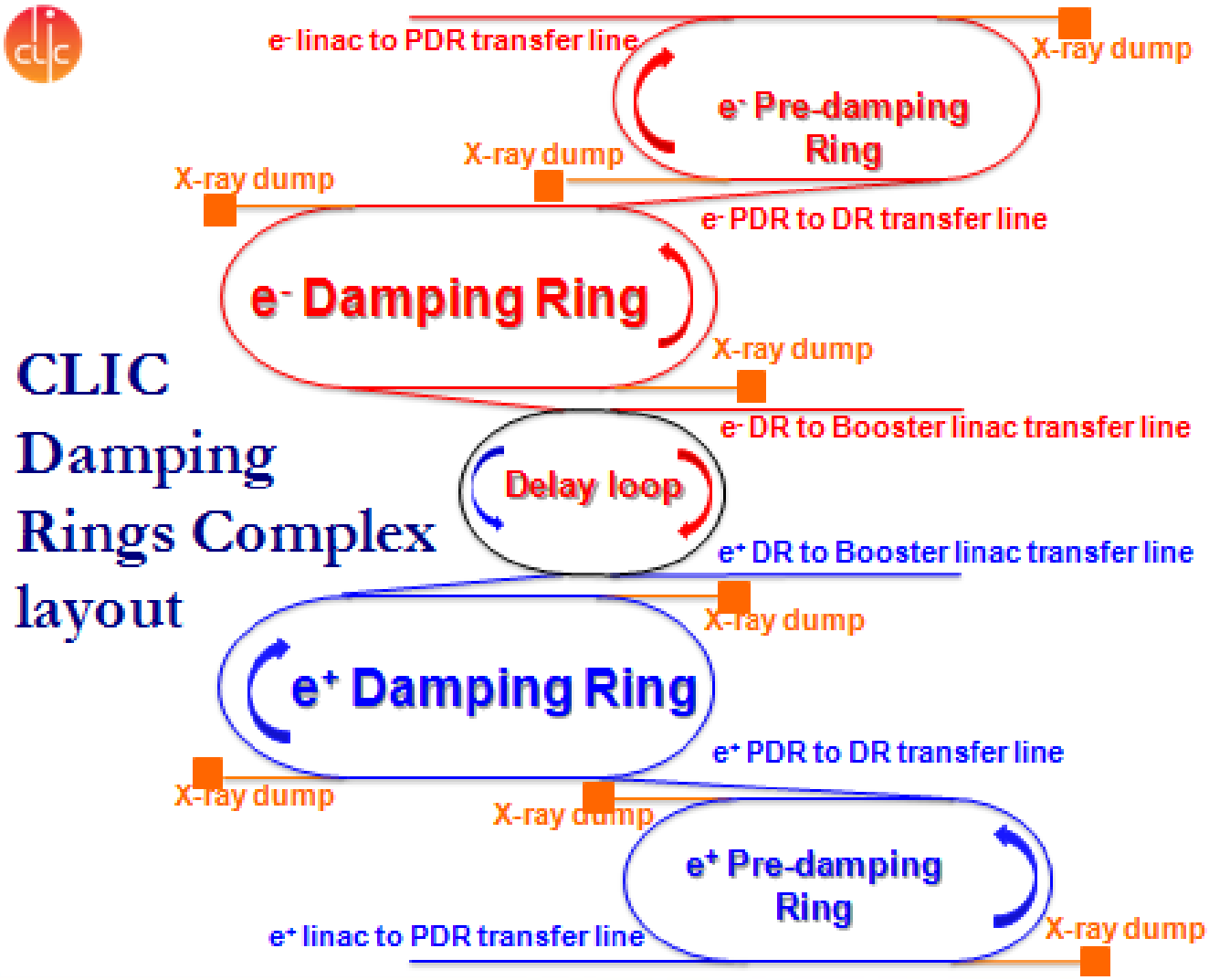
Helical undulator based CLIC positron source for 500GeV Ecm stage



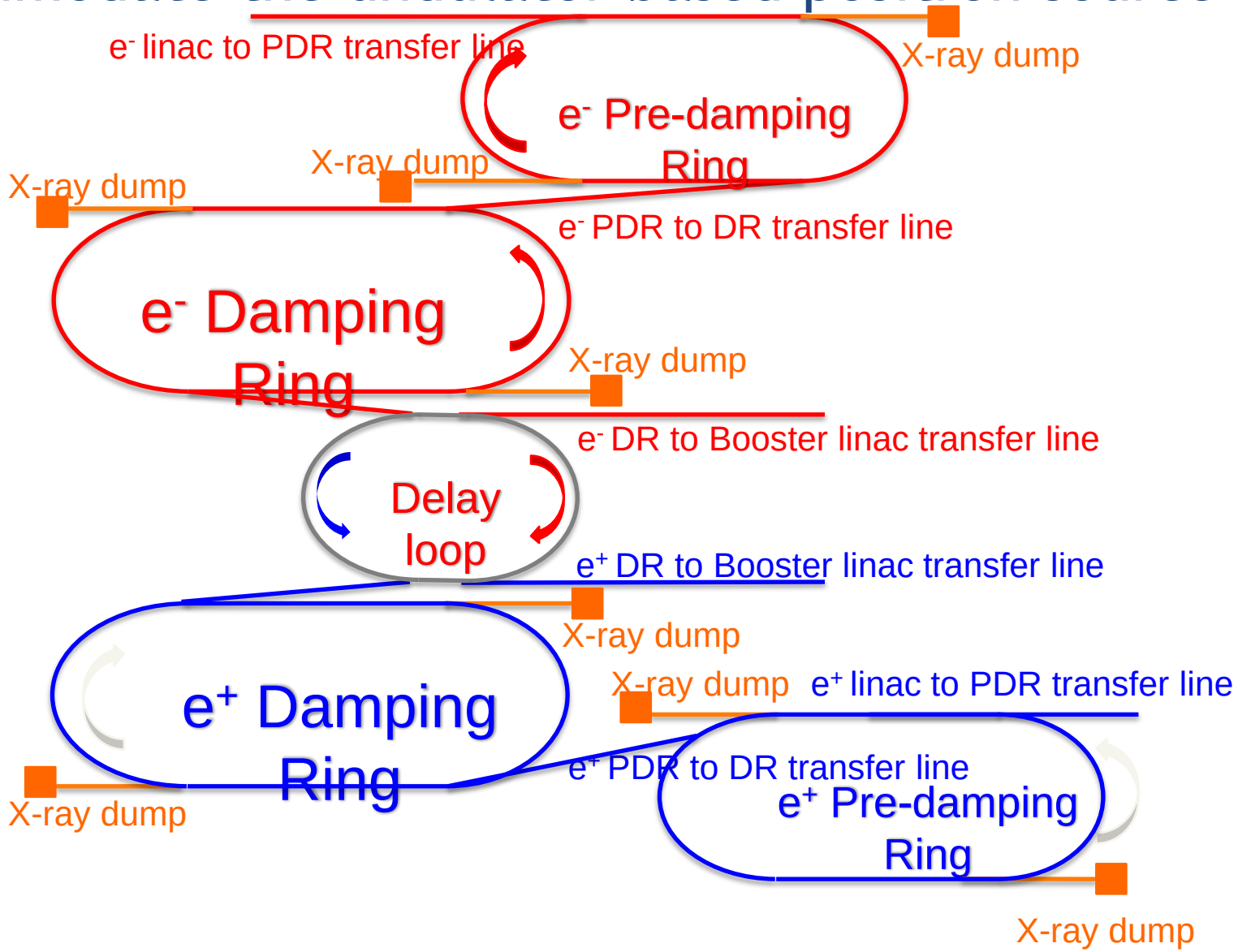


CLIC damping ring complex layout,

from Prof. Junji Urakawa (KEK), Dr. Yannis Papaphilippou (CERN)



A Modified CLIC Damping Rings Complex layout to accommodate the undulator based positron source



The modification is to allow injection to e+ pre-damping ring from a different direction

Advantage:

- Undulator located at end of e- main linac makes it essentially the same as ILC TDR positron source and thus most of our results regarding undulator based positron source for ILC can be applied with some minor adjustments. (CLIC injector linacs are running at 2GHz while ILC is 1.3GHz all the way,….)
- Possibility for polarization upgrade

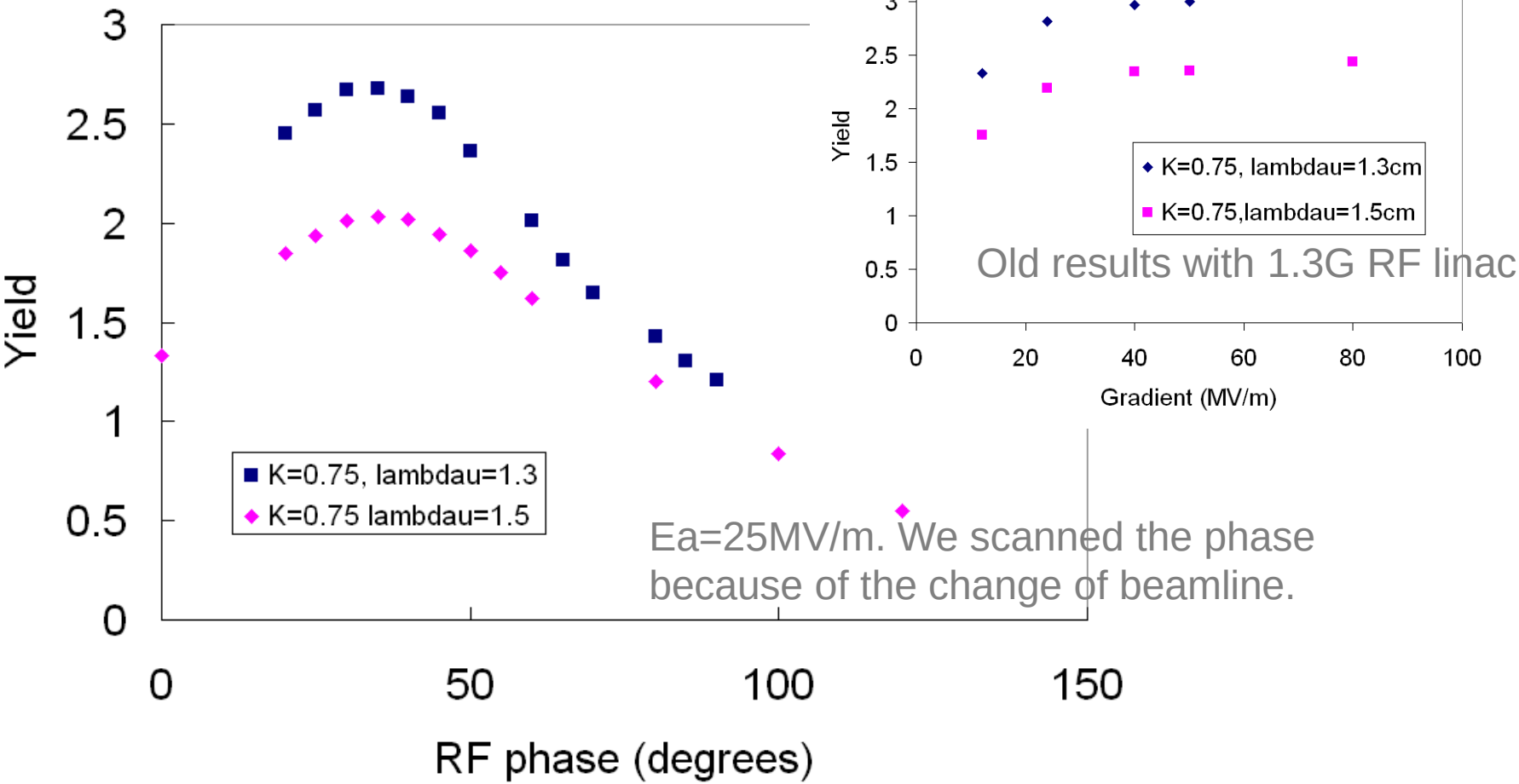
Limitations:

- Can not go bellow 250GeV Ecm without a new undulator with shorter period and higher field(need a technology break through).

What is needed to be done:

- Collaborating with Damping ring, RTML, and BDS groups to explore their range of flexibility and come up with a more detailed realistic layout and a beamline lattice design.
- Explore options for 3TeV stage

Comparing with old simulation results with 1.3GHz RF



Old results with 1.3G RF linac

Ea=25MV/m. We scanned the phase because of the change of beamline.

Comparing with the old result with 1.3GHz RF, the yield lowered slightly when using 2GHz RF.

Using ILC RDR undulator with CLIC capturing optics