

For Overall Layout of ILC Beam Line Layout Choices

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Possible Beam Line Layout of ILC-(A)

Layout based on following choices.

Positron source:

Prepare both conventional and undulator based.

Probably, start with conventional and prepare space for undulator

Place the undulator at Ebeam = 150 GeV (USTOS)

Damping Ring:

Dogbone DR, sharing tunnel with Main Linac.

Avoid DR - Main Linac interference in the first stage.

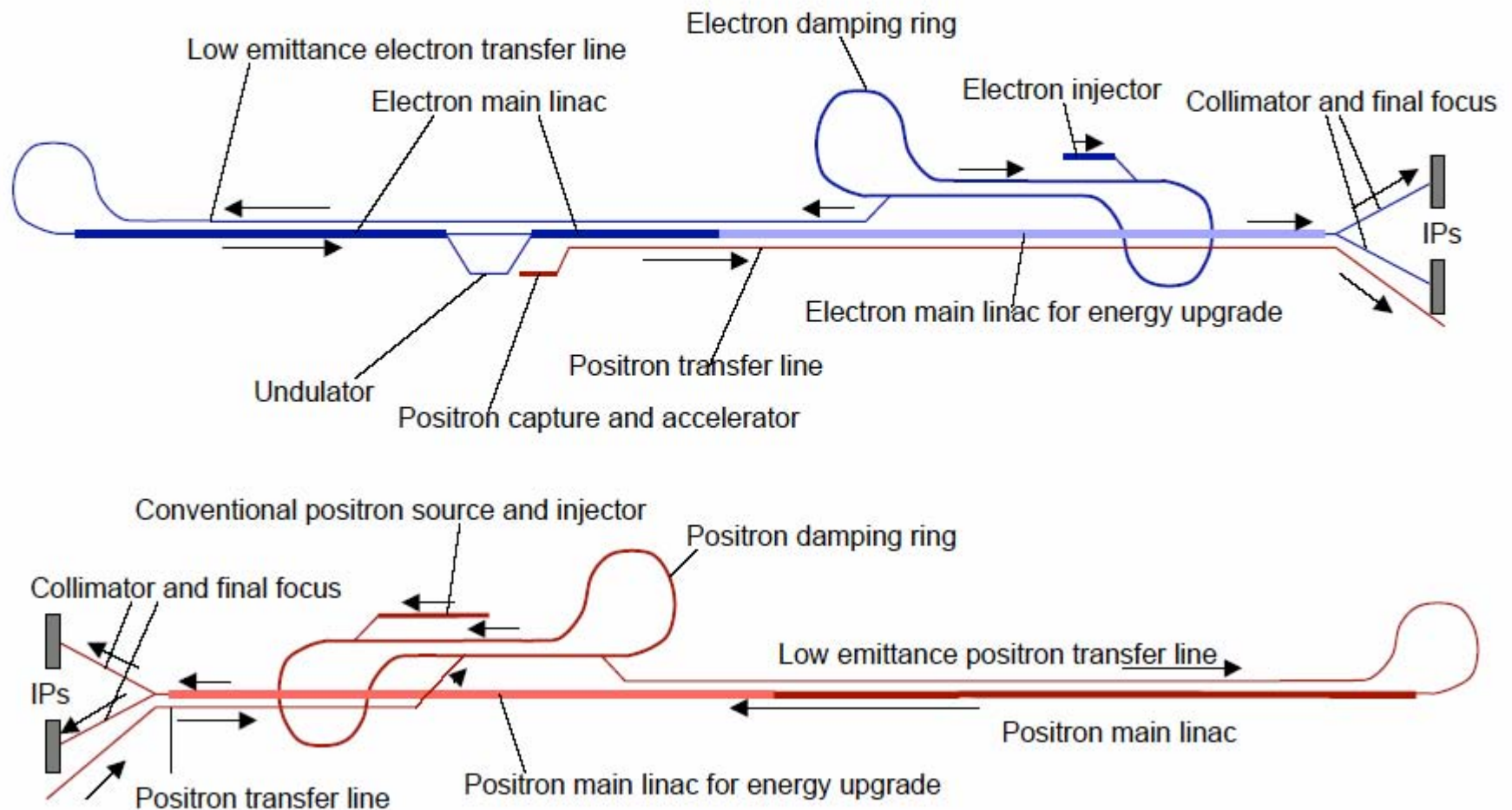
(Oide - scheme)

Turn Around:

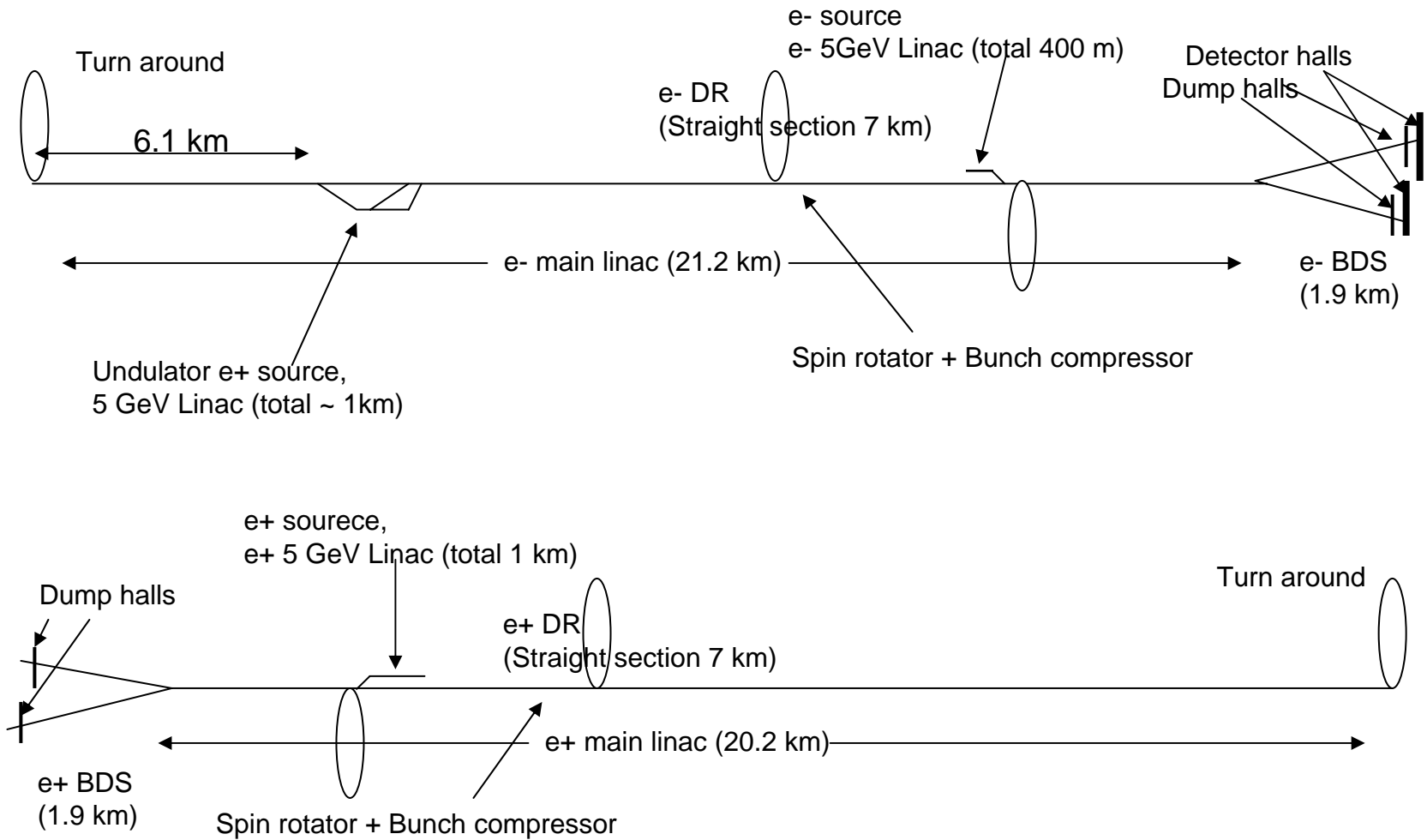
180 degree turn around after damping rings.

This scheme allows orbit feed-forward after DR.

Schematic Layout of Beam Line (Conventional and Undulator e^+ source)



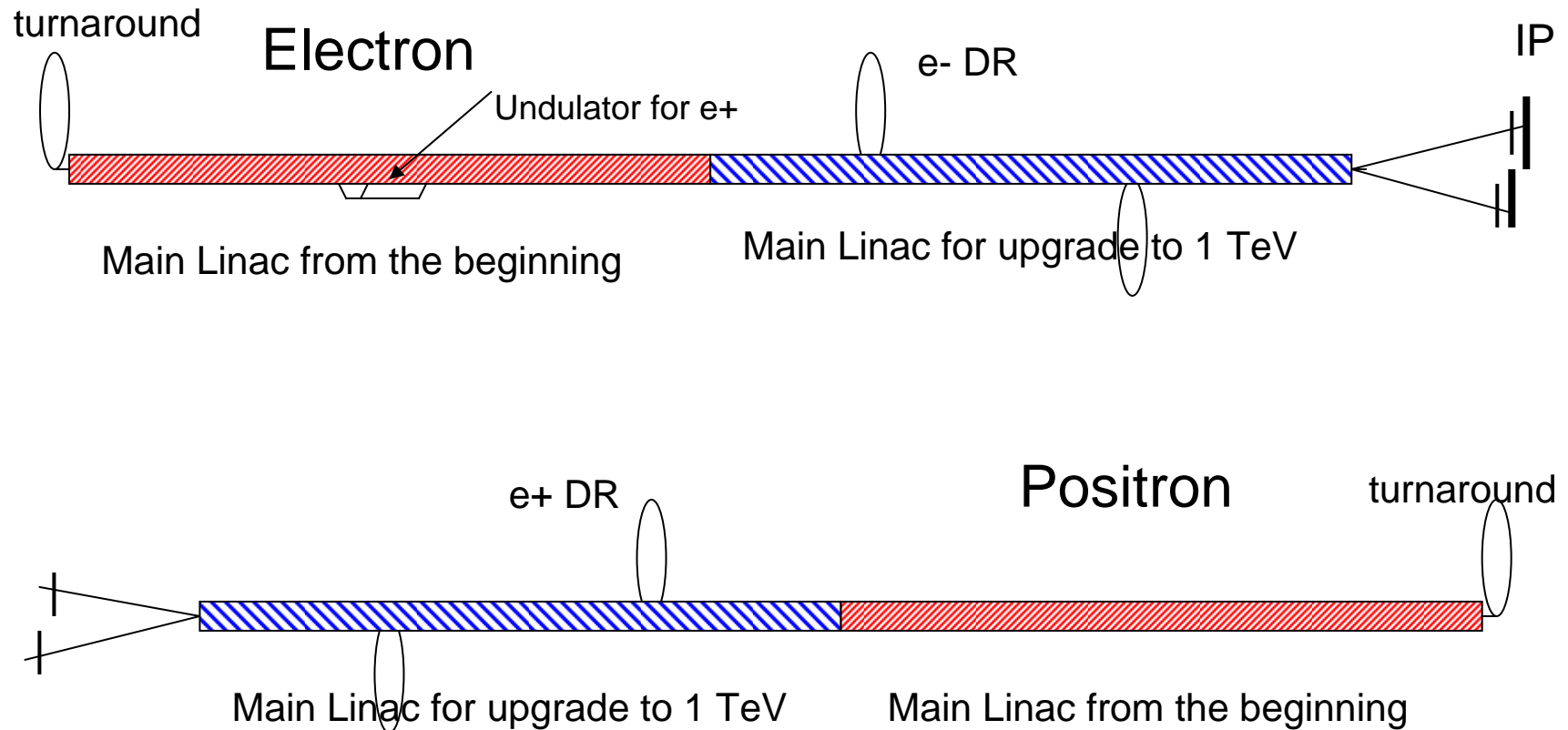
Schematic Layout and length of each part



Numbers should be reviewed by experts.

Energy upgrade scheme

No DR-ML interference in the first stage. (Oide - scheme)



Possible Beam Line Layout of ILC-(B)

Layout without undulator based e⁺ source

Positron source:

Conventional.

Damping Ring:

Dogbone DR, sharing tunnel with Main Linac.

Avoid DR - Main Linac interference in the first stage.

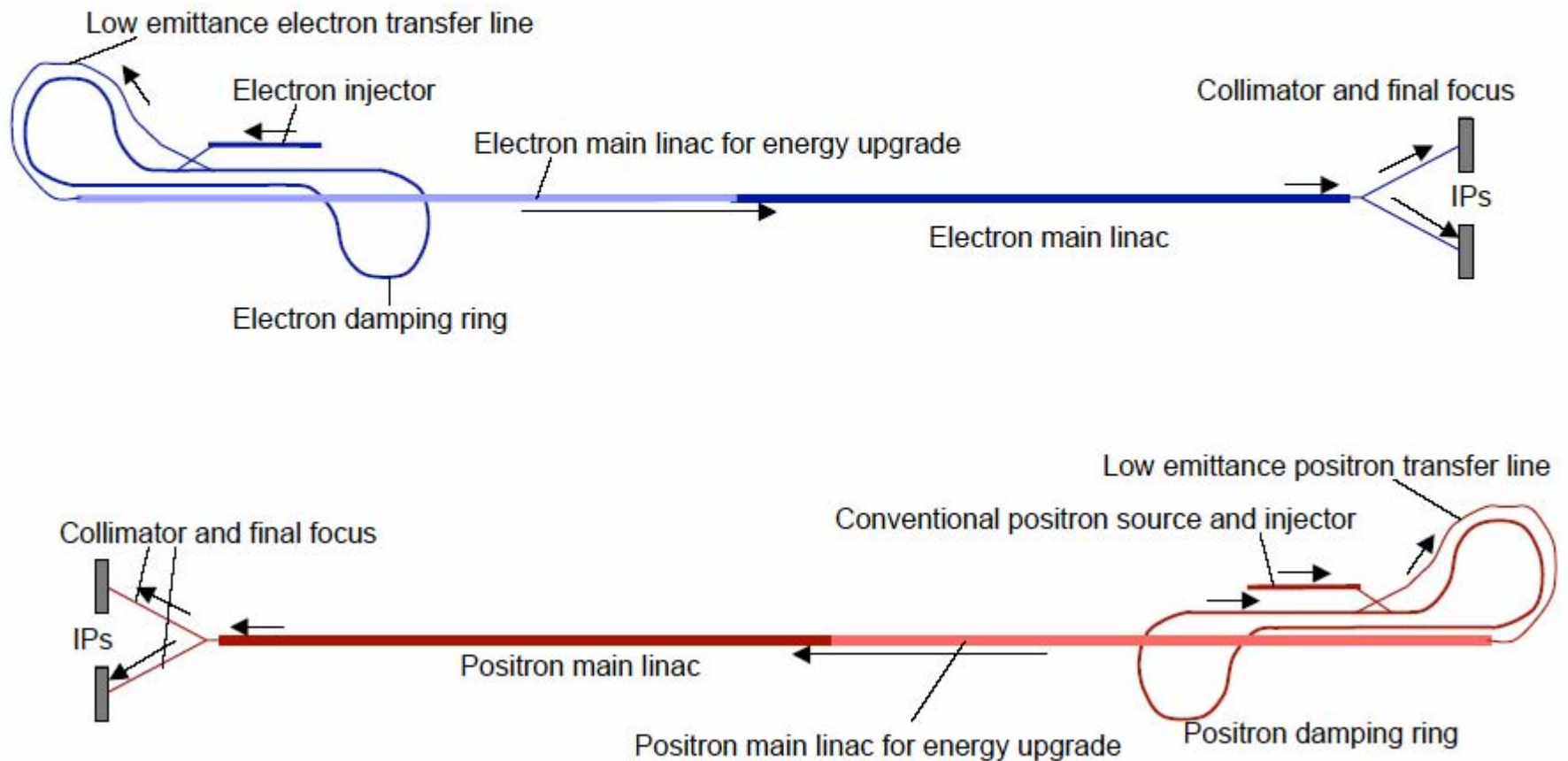
(Oide - scheme)

Turn Around:

180 degree turn around after damping rings.

This scheme allows orbit feed-forward after DR.

Optional Schematic Layout of Beam Line -(B) (No Undulator e⁺ source. With Oide-scheme)



Possible Beam Line Layout of ILC-(C)

Layout without undulator based e^+ source
Without O-de-scheme

Positron source:

Conventional.

Damping Ring:

Dogbone DR, sharing tunnel with Main Linac.

Empty tunnel for 500 GeV ECM operation.

(It allows major preparations for upgrade during operation.)

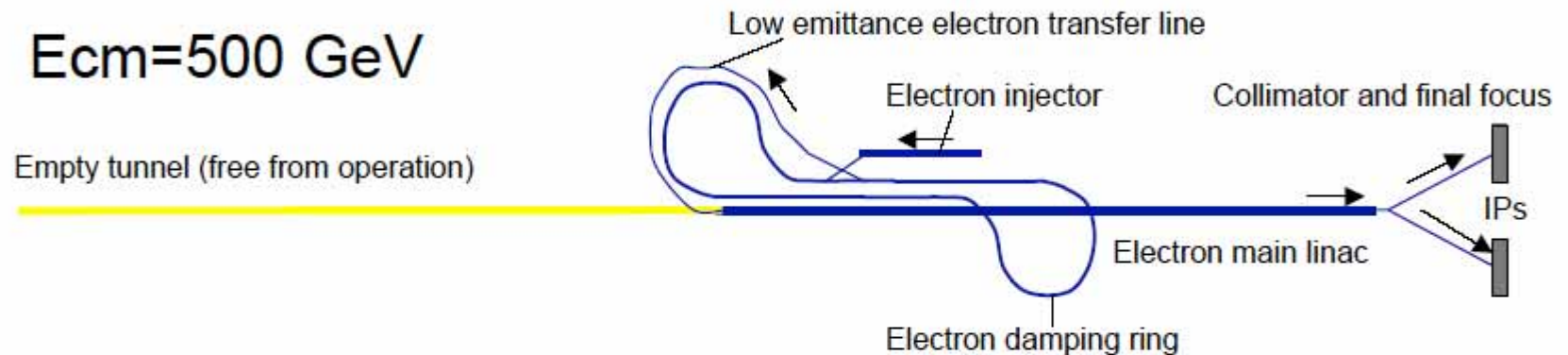
Turn Around:

180 degree turn around after damping rings.

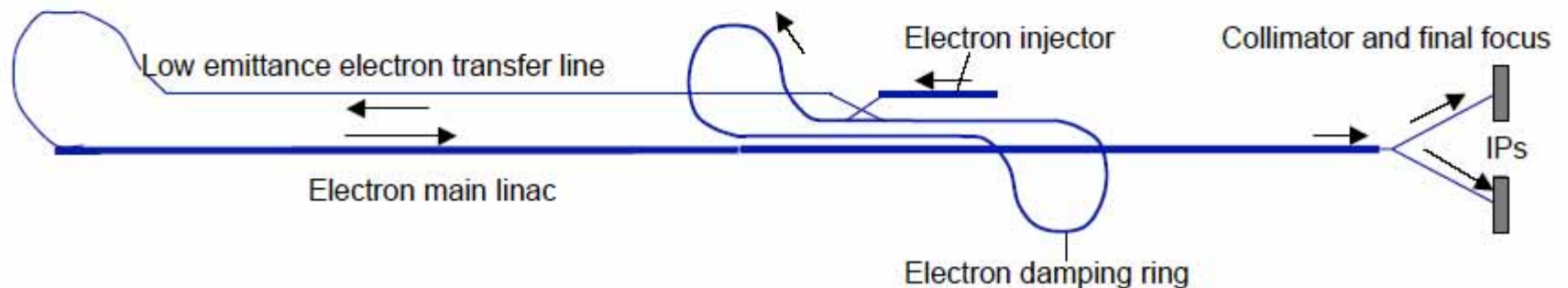
This scheme allows orbit feed-forward after DR.

Optional Schematic Layout of Beam Line -(C)
(Electron line is shown. Positron line is similar.)
(No Undulator e^+ source, without Oide-scheme)

$E_{cm}=500\text{ GeV}$



$E_{cm}=1000\text{ GeV}$



Of course, there are many other options

- Independent DR tunnels
- Undulator near IP

Decision will be mostly based on:

- Choice of e⁺ source technology
- DR design, beam dynamics
- Commissioning and Availability consideration (DR-ML sharing tunnel or not)
- Overall cost

What should be considered from LET Beam Dynamics (WG1) point of view

Low Emittance Preservation in:

- **Low Emittance Turn Around** after DR

This is essential for Feed Forward which allow reasonable stability tolerance of extraction kicker of DR. Need to design.

- **Long, Low Energy, Low Emittance Transport** in Layout (A) (before turn around) and Layout (B)(after turn around)
- DR-ML field interference (probably WG3b issue)