CHANGE REQUEST NO. ILC-CR-00XX	EDMS No: **D*xxxxxxx**	Created: **27-10-2015**
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THE CFS DESIGN COMPATIBLE WITH BOTH UNDULATOR SOURCE AND E-DRIVEN SOURCE

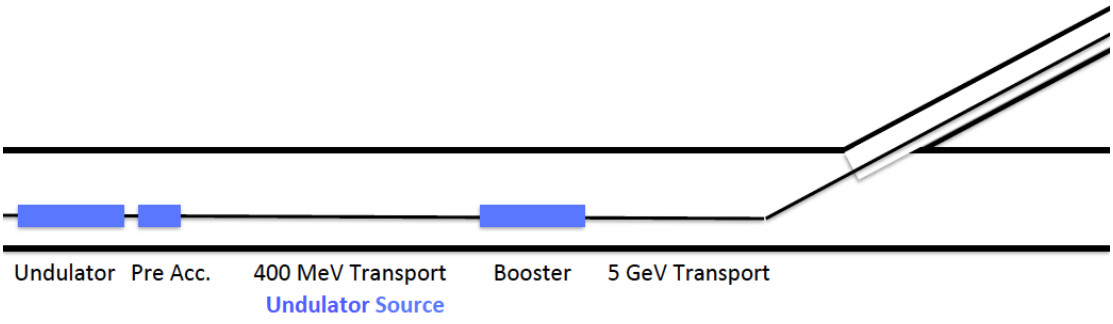
Make the CFS design compatible with both undulator positron source and e-driven positron source. The new design can accommodate both sources.

RATIONALE

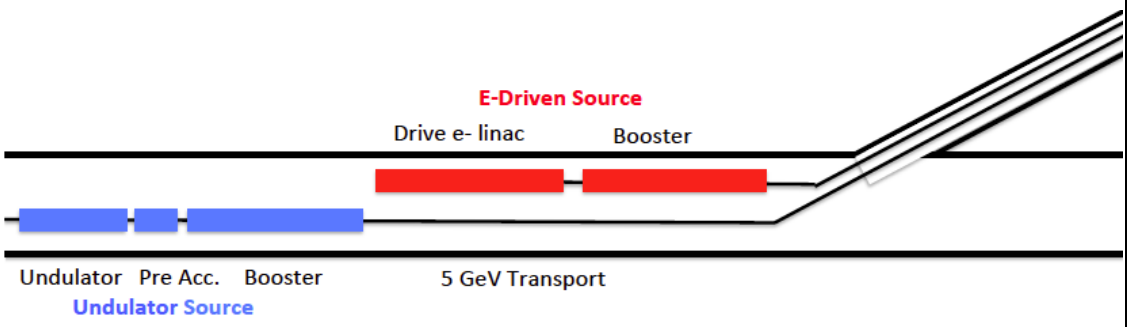
In case the development of the positron production target for the undulator source be delayed, we would need to install the e-driven positron source. In that event, later we will install the undulator source. At that time it will be preferable to keep the e-driven source in the tunnel for the flexible operation. The request provides an option for adopting the e-driven positron source (the 300 Hz conventional source) as the backup. This will maximize the flexibility and minimize the risk related to the positron source R/D.

SCOPE: ELECTRON BDS TUNNEL AND POSITRON SOURCE

The required length of the e-driven source from the electron gun to the energy compressor for the positron is estimated to be ~1.1km(*). One of the possible location of the e-driven source is in the BDS tunnel at the downstream of the undulator source. In the TDR design, there is a long low energy (400 MeV) transport line between the positron pre-accelerator and the booster.



When we remove the 400MeV transport line and relocate the positron booster linac to upstream, there will be a long space which can accommodate the e-driven source longitudinally. . In this case the e-driven source is located(**) at the downstream of the undulator positron source side-by-side with the high energy (5 GeV) positron transport line of the undulator source, the electron BDS, and the electron transport line from DR.



At the location of the e-driven source, both the accelerator tunnel and the service tunnel may have to be slightly enlarged in transverse direction. It is necessary to make additional transverse enlargement and the radiation shielding at the location of the positron production target of the e-driven source. The required space for the e-driven target is similar or slightly larger than those of the undulator target. The detail of the necessary transverse enlargement will be a subject of future study.

(*) Note: This is a result of rough estimation. We need further study to get exact length.
(**) Note: Actual installation of the e-driven source is not within the scope of this change request.

COST IMPACT

Now the CFS team is preparing a site-specific design and the cost estimate of the BDS tunnel for the baseline positron source only. After it is completed we can make the cost estimate of the modification of the tunnel design.

Both the possible cost increase by installing the e-driven source (if we

really install it), and the possible initial cost reduction by postponing the undulater source (if we really postpone it) to a future upgrade, will not be included in the cost impact.

The rough cost estimate of the e-driven source is described in the "xxx-yyy-zzz.pdf".

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