

Undulator-Conventional Footprint Compatibility

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LCWS 2014, Hyatt Regency, Belgrade

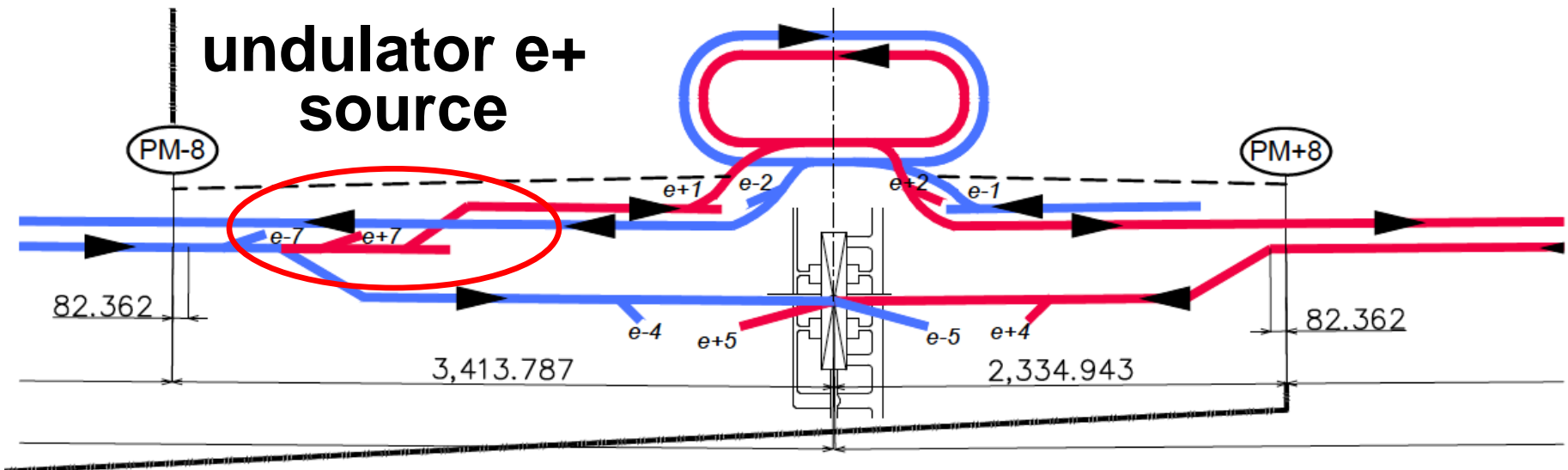
Past Discussions

Undulator-Conventional Compatibility

Discussion@LCWS2013(Tokyo)

If we start with "Conventional", we need to keep smooth path to "Undulator".
footprint compatibility (no change of the tunnel)

- "300Hz conventional source" should fit the space for "undulator source"



Discussion@LCWS2013(Tokyo)

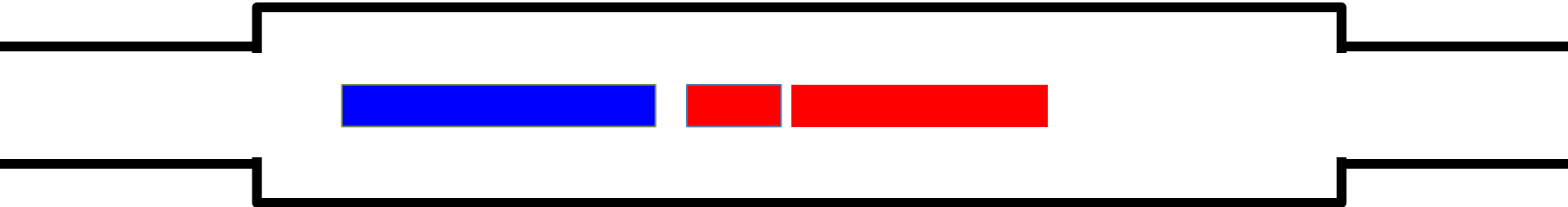
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footprint compatibility (no change of the tunnel)

- "300Hz conventional source" should fit the space for "undulator source"

1st step

300 Hz conventional e+ source



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footprint compatibility (no change of the tunnel)

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Remove the Conventional Source



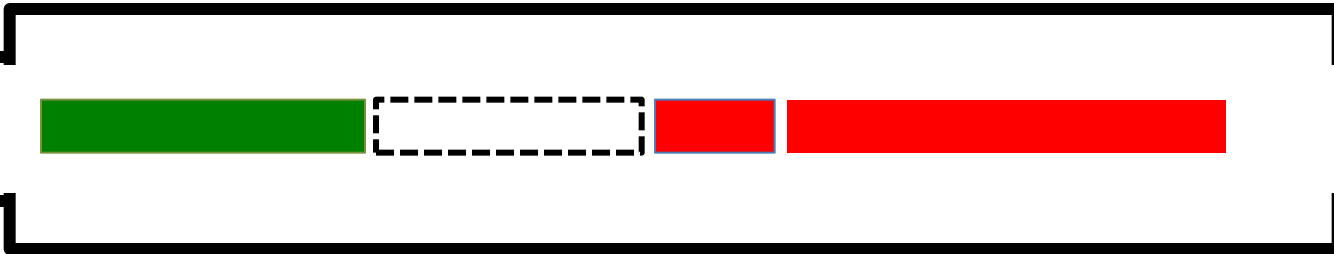
Discussion@LCWS2013(Tokyo)

If we start with "Conventional", we need to keep smooth path to "Undulator".
footprint compatibility (no change of the tunnel)

- "300Hz conventional source" should fit the space for "undulator source"

2nd step

undulator e+ source



Nick's Suggestion@ADI-CFS(Tokyo, April 2014)

Both in the tunnel

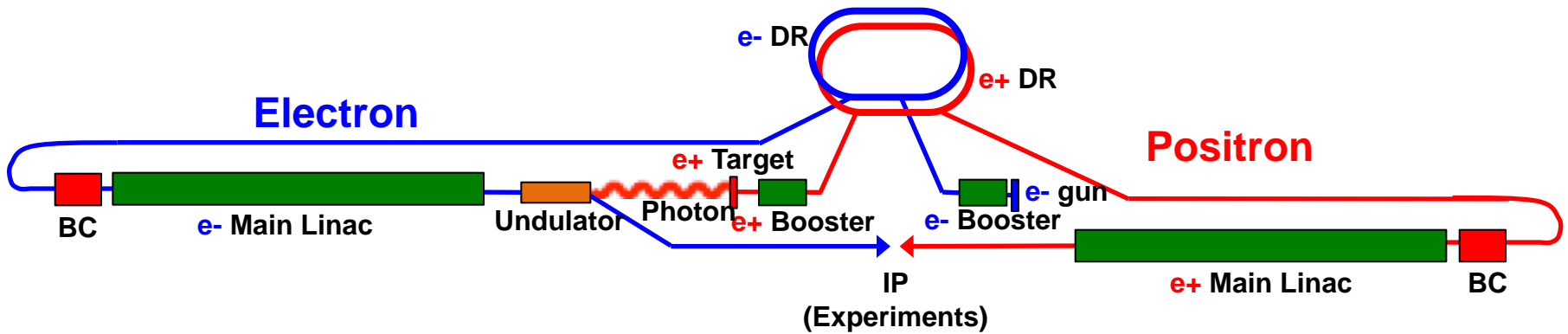
300 Hz conventional e⁺ source



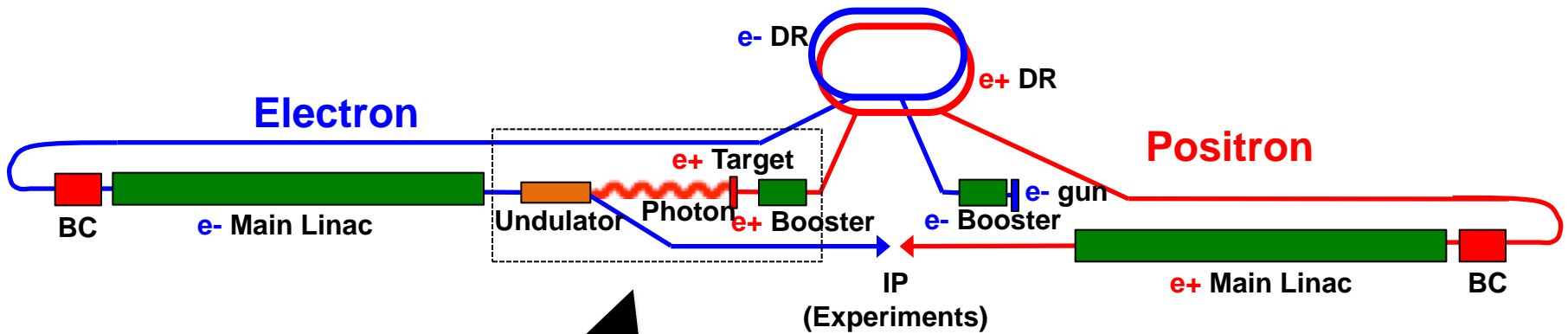
undulator e⁺ source

**Try to follow
Nick's Suggestion**

ILC Undulator-based e^+ Source

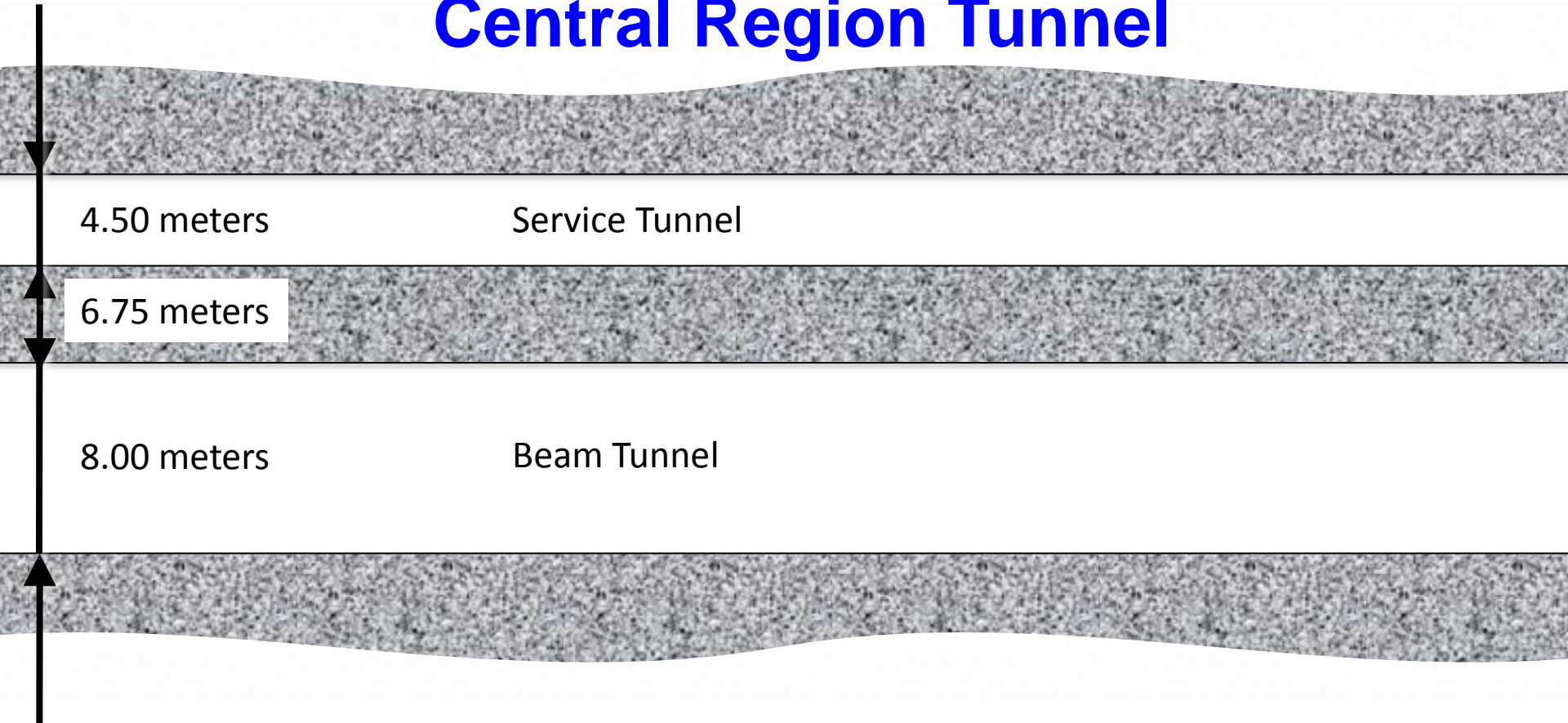


ILC Undulator-based e^+ Source

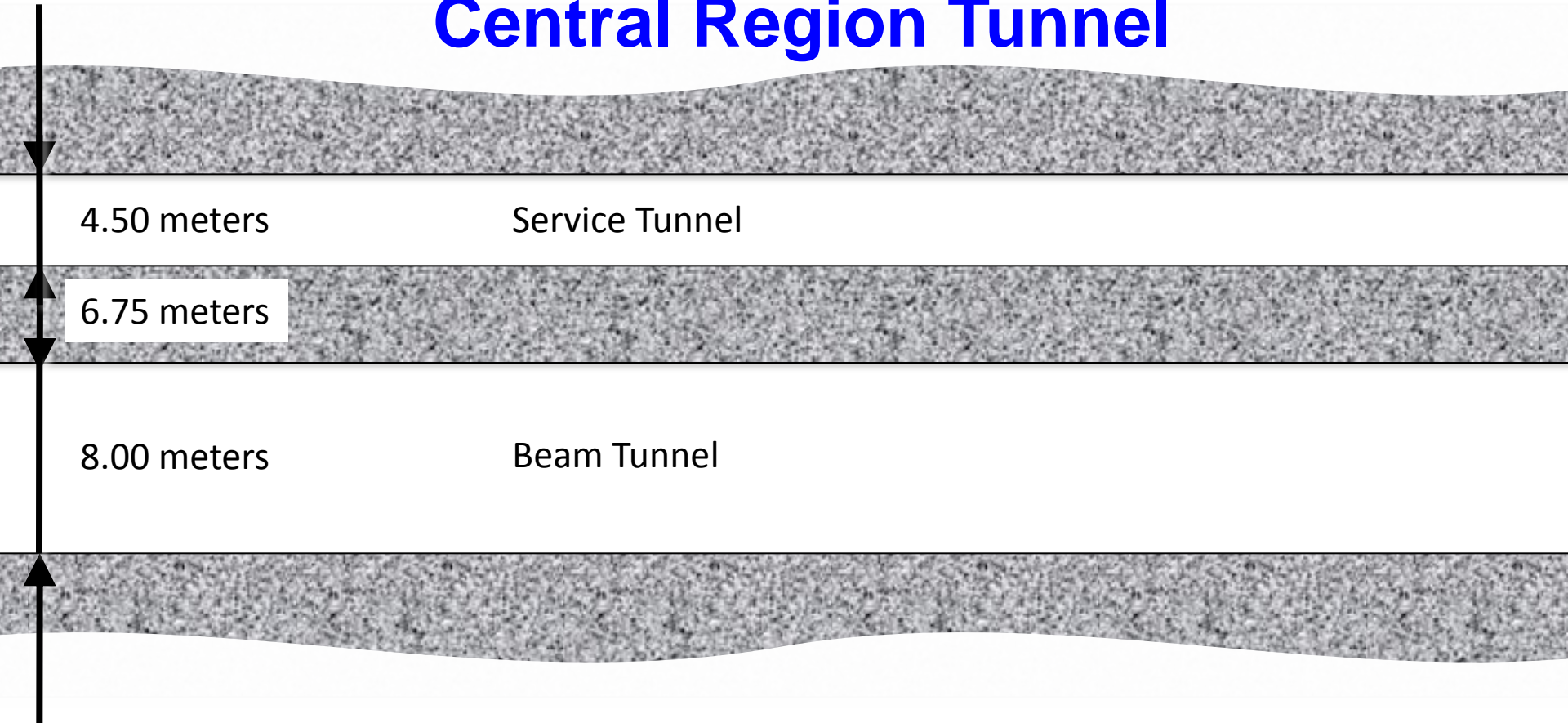


Look closer

Central Region Tunnel

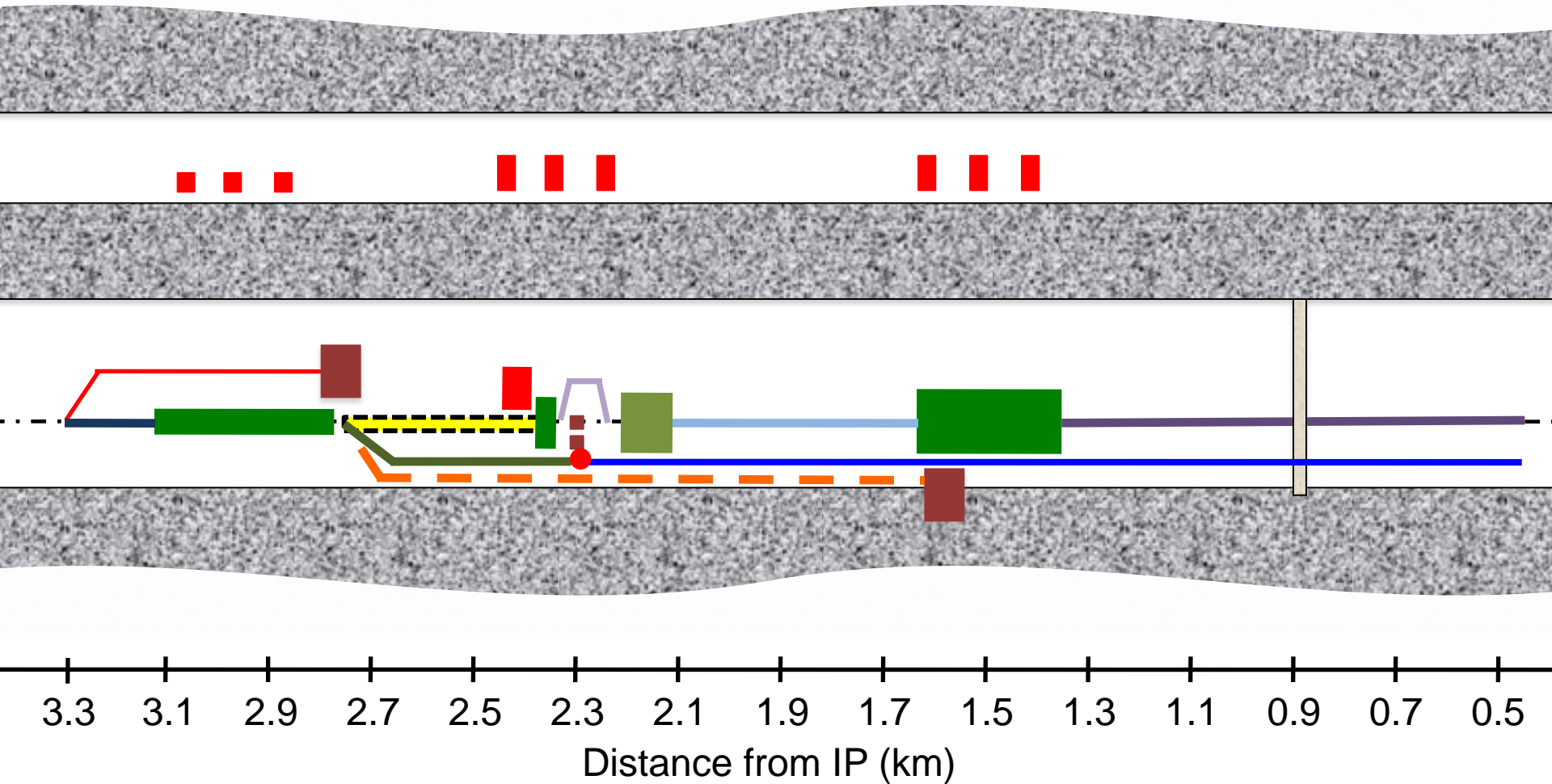


Central Region Tunnel

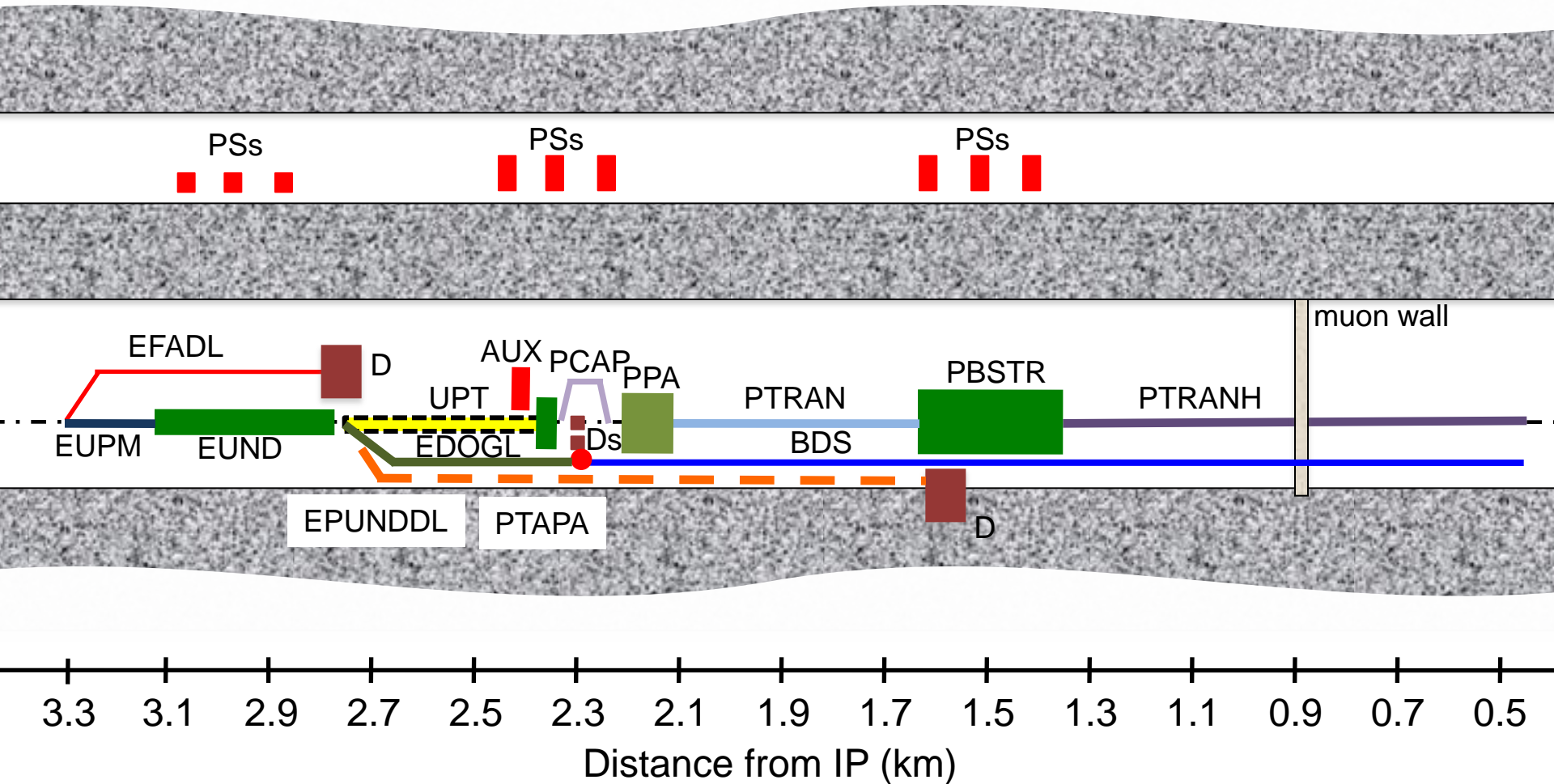


Twin-Tunnel
The Tunnel is Wide.

Undulator Source in Central Region Tunnel



Undulator Source in Central Region Tunnel

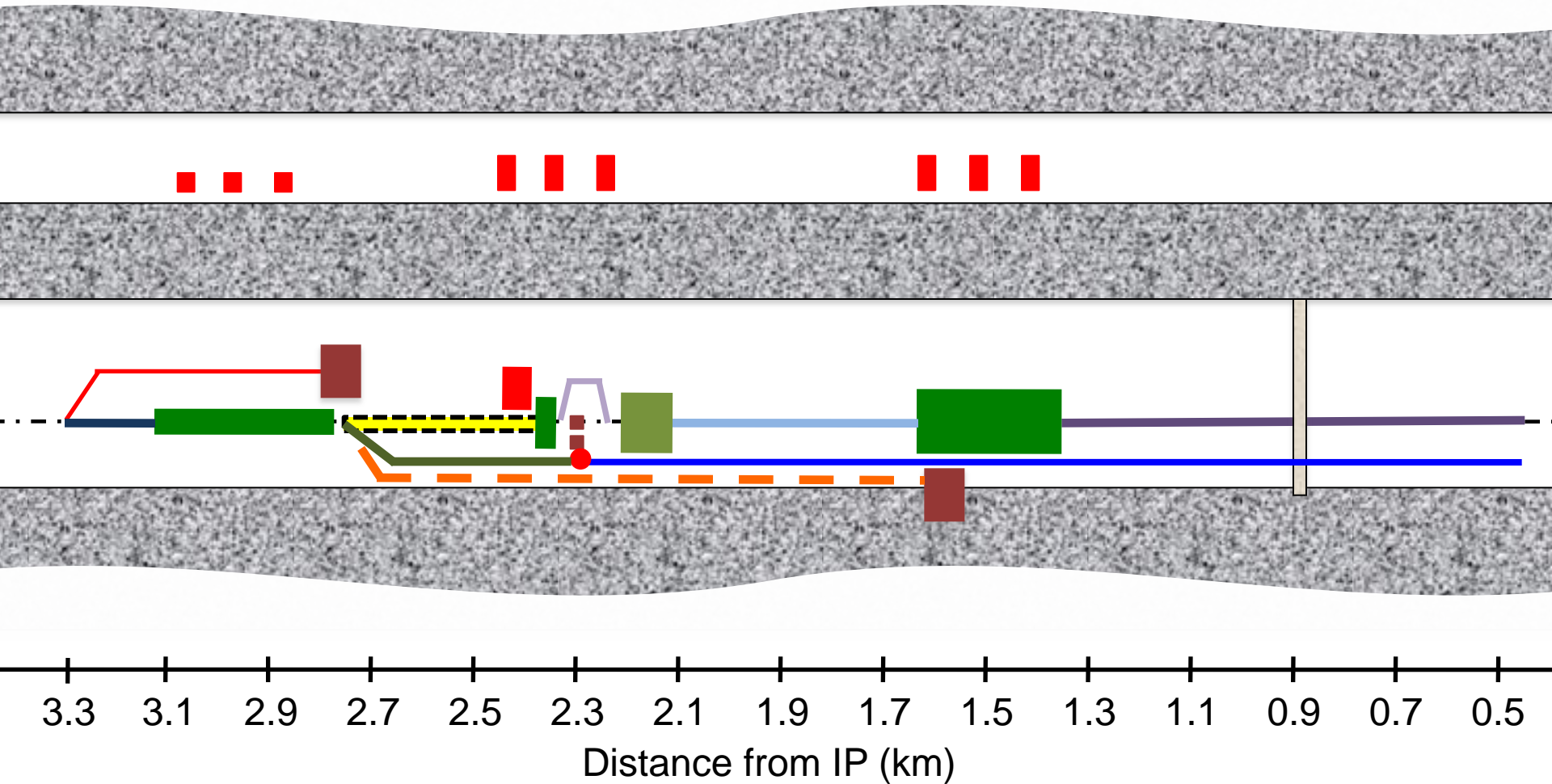


EUPM Electron Undulator Protection and Matching
 EUND Electron Undulator Section
 EFADL Electron Fast Abort Line
 UPT Undulator Photon Transport to Target
 PTAPA Positron Source Target Area and Pre-Accelerator
 EDOGL Electron Dogleg
 EPUNDDL Electron Post-Undulator Dump Line

PCAP Positron Source Capture Section
 PPA Positron Source Pre-Accelerator
 PTRAN Positron Source Transfer Line
 PBSTR Positron Source 5GeV Booster
 PTRANH Positron Source Transfer Line (High Energy)
 AUX Auxilliary Source

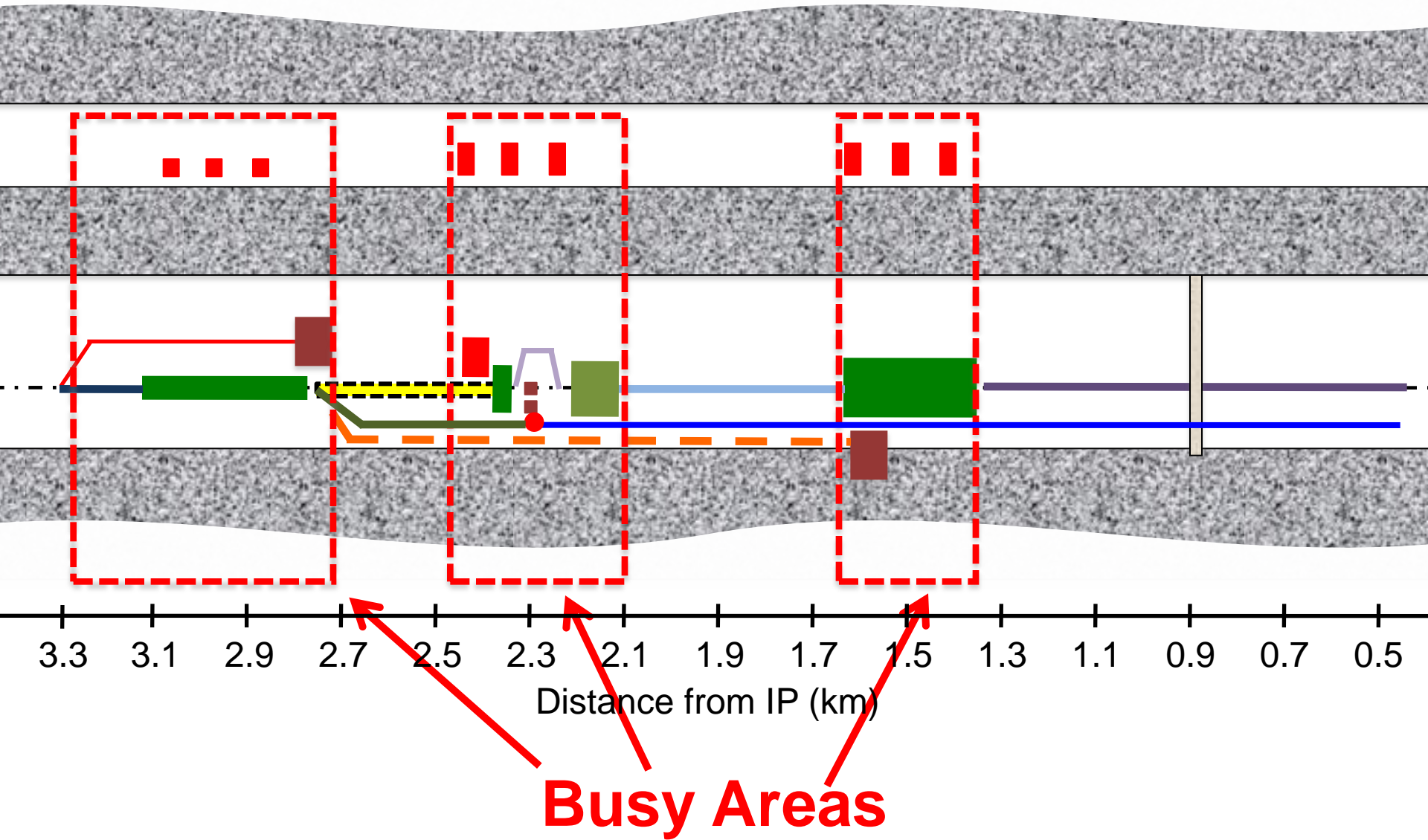
ref. G-05, G-06, U-04, U-05, U-06, U-07, U-08, U-09, U-10, U-11

Undulator Source in Central Region Tunnel

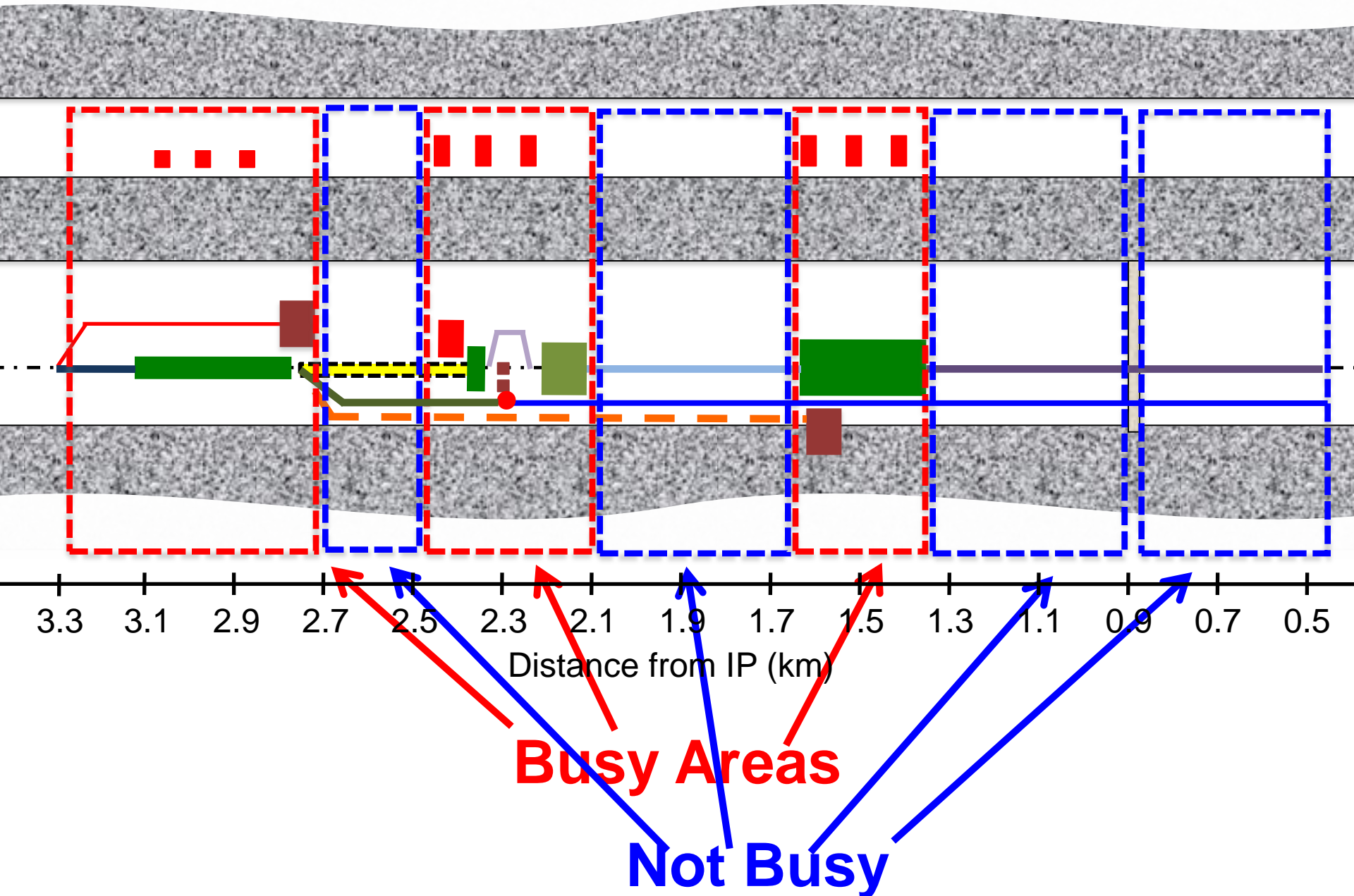


The Undulator Source is Long.

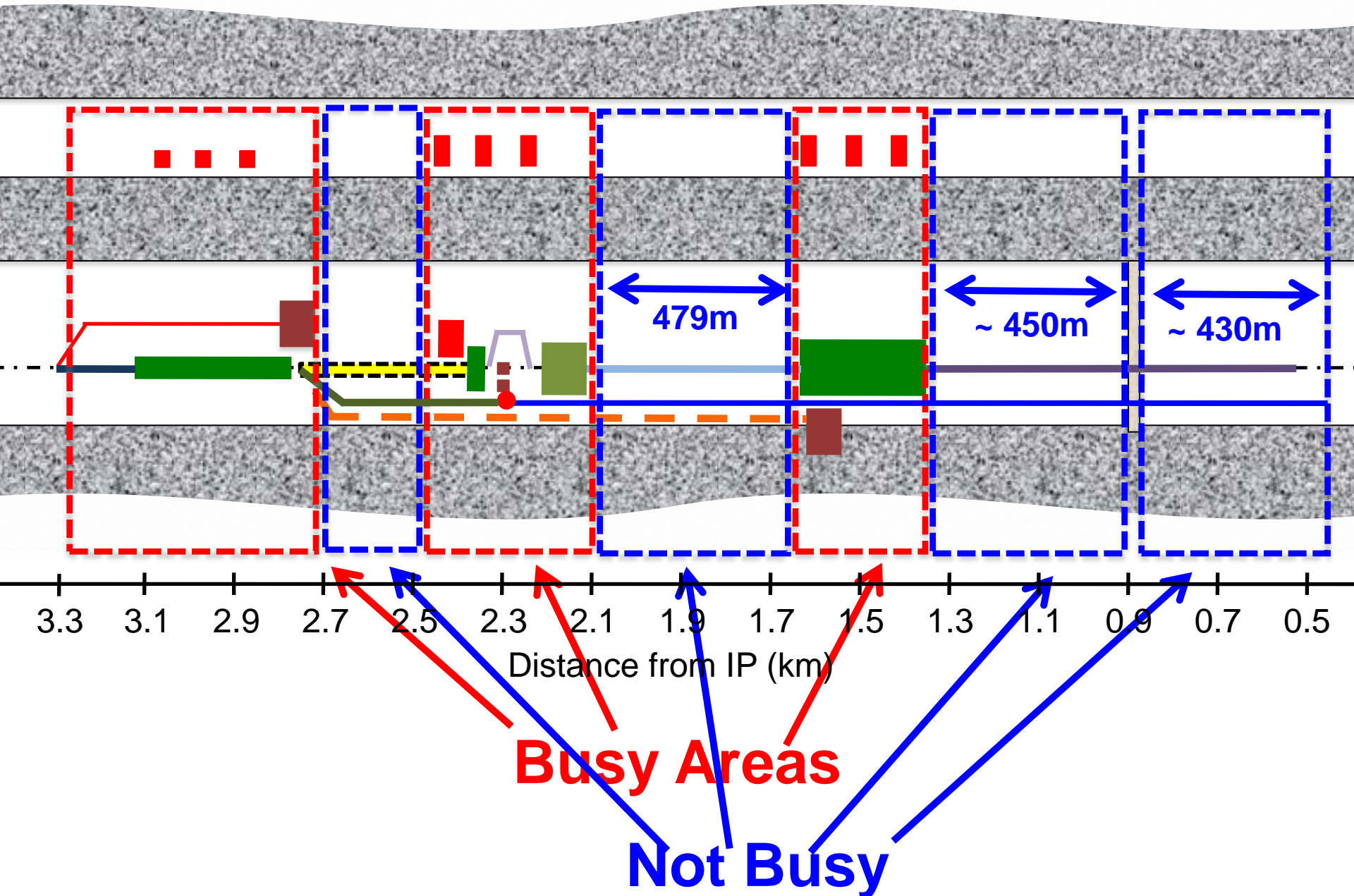
Undulator Source in Central Region Tunnel



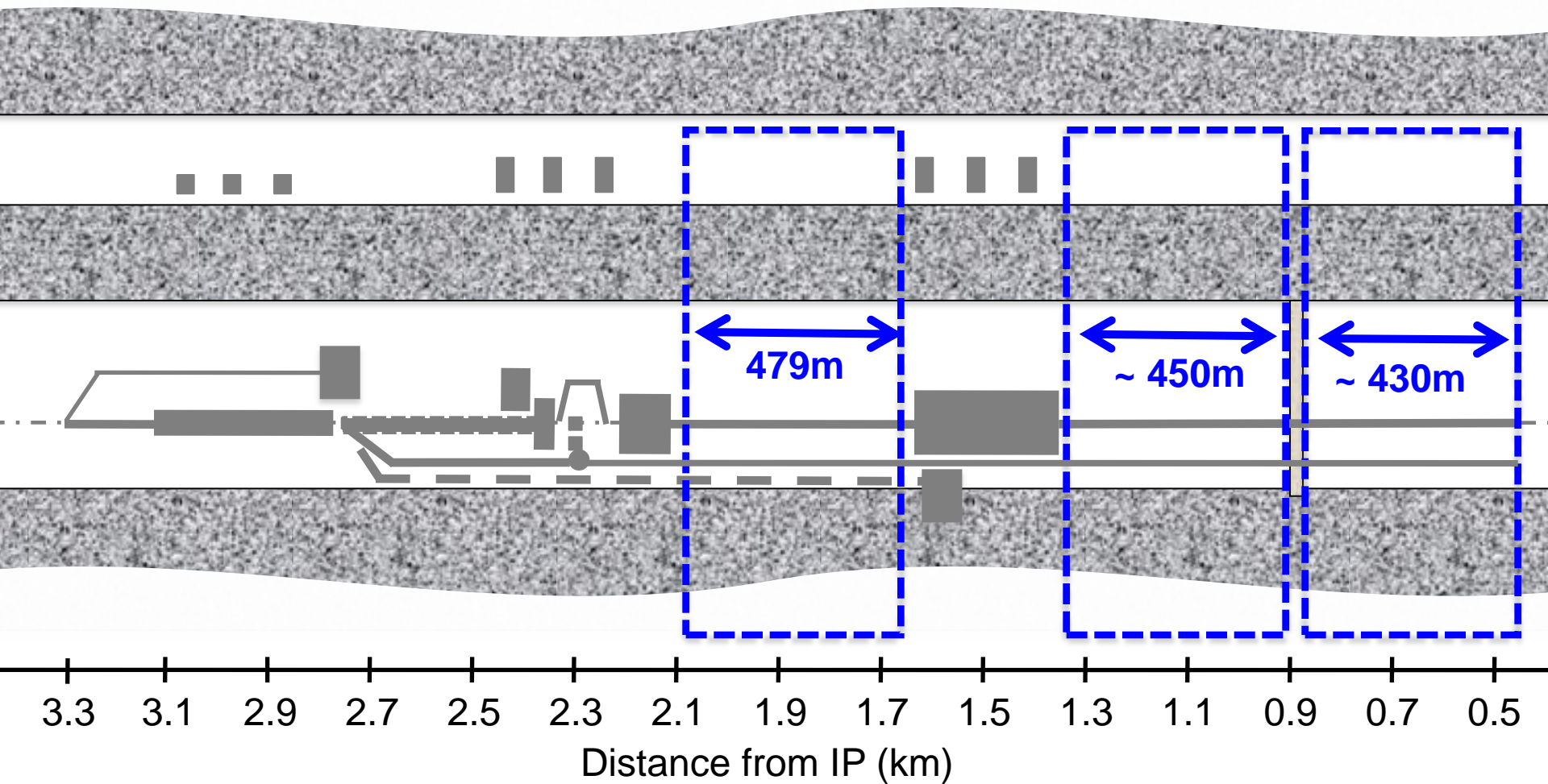
Undulator Source in Central Region Tunnel



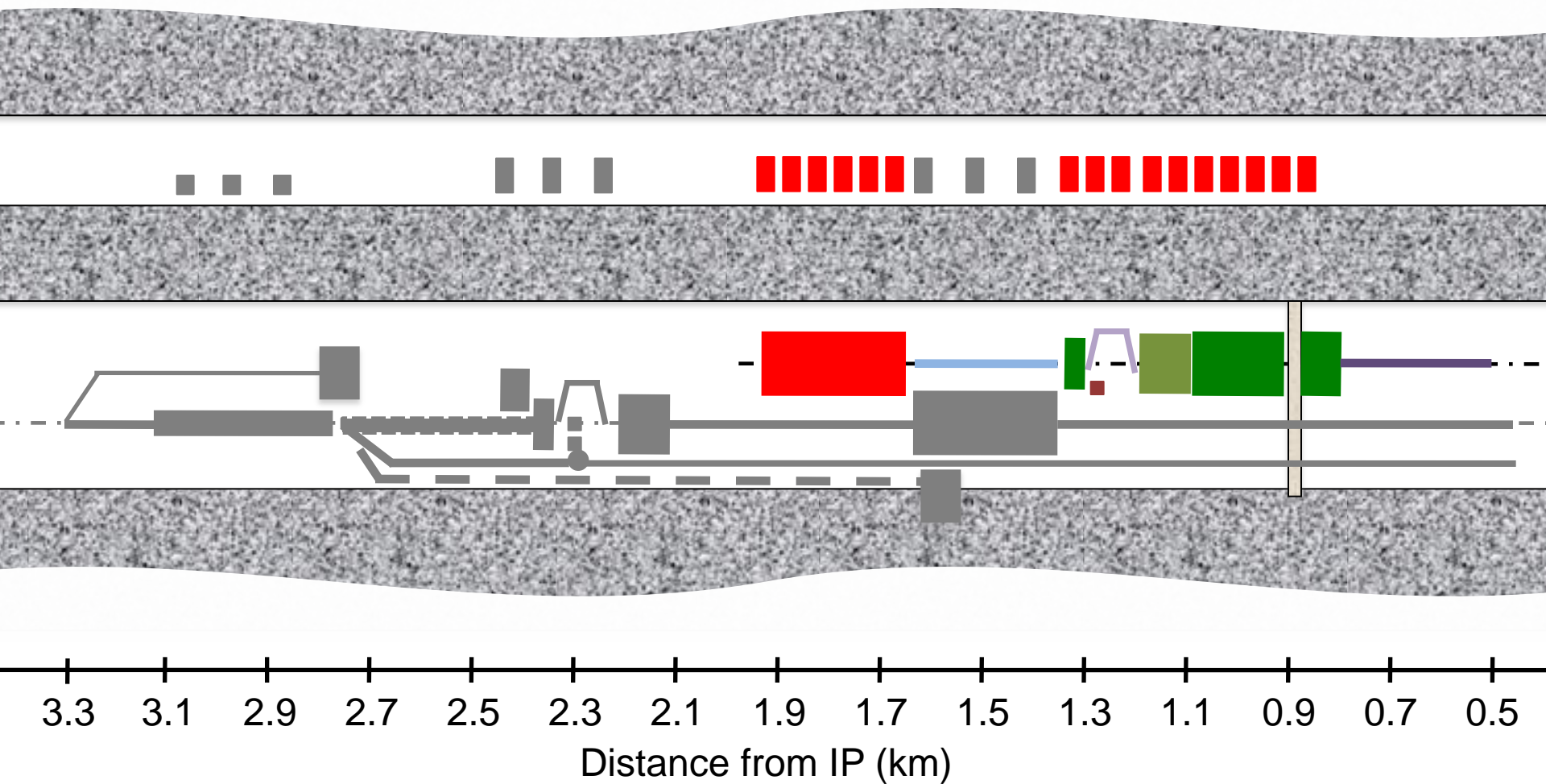
Undulator Source in Central Region Tunnel



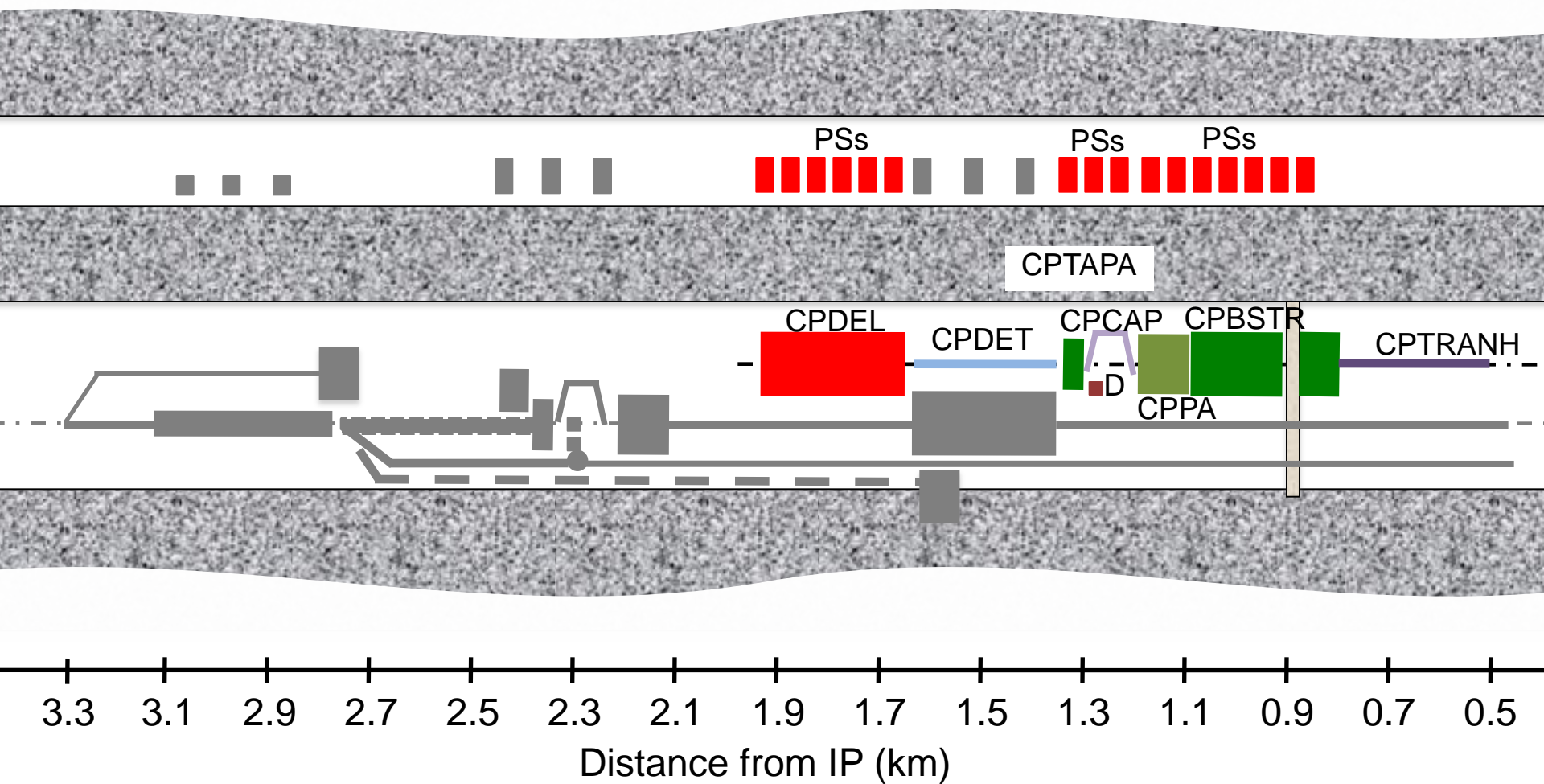
Use Not-Busy Areas



Conventional Source in Central Region Tunnel



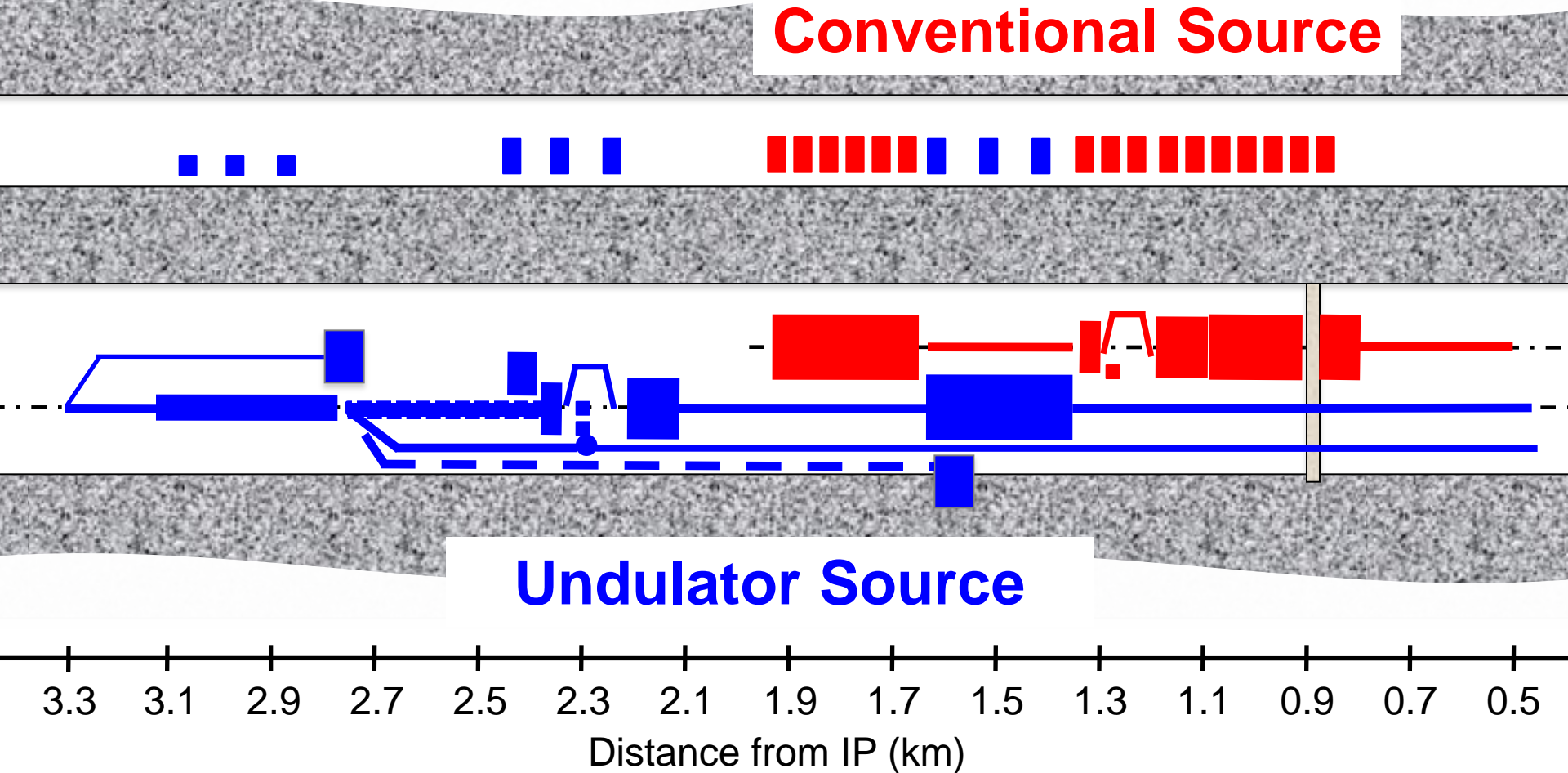
Conventional Source in Central Region Tunnel



- CPDEL Conventional Positron Source Drive Electron Linac
- CPTAPA Positron Source Target Area and Pre-Accelerator
- CPCAP Conventional Positron Source Capture Section
- CPPA Conventional Positron Source Pre-Accelerator
- CPDET Conventional Positron Source Drive Electron Transfer Line
- CPBSTR Conventional Positron Source 5GeV Booster
- CPTRANH Conventional Positron Source Transfer Line (High Energy)

Both Sources in Central Region Tunnel

Conventional Source



Undulator Source

Footprint Compatibility
Both Sources in TDR Tunnel

Summary

1. We can put both undulator and conventional sources in TDR tunnel without significant change of the design.

Footprint Compatibility

2. All are preliminary.
Need more careful studies.

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Footprint Compatibility

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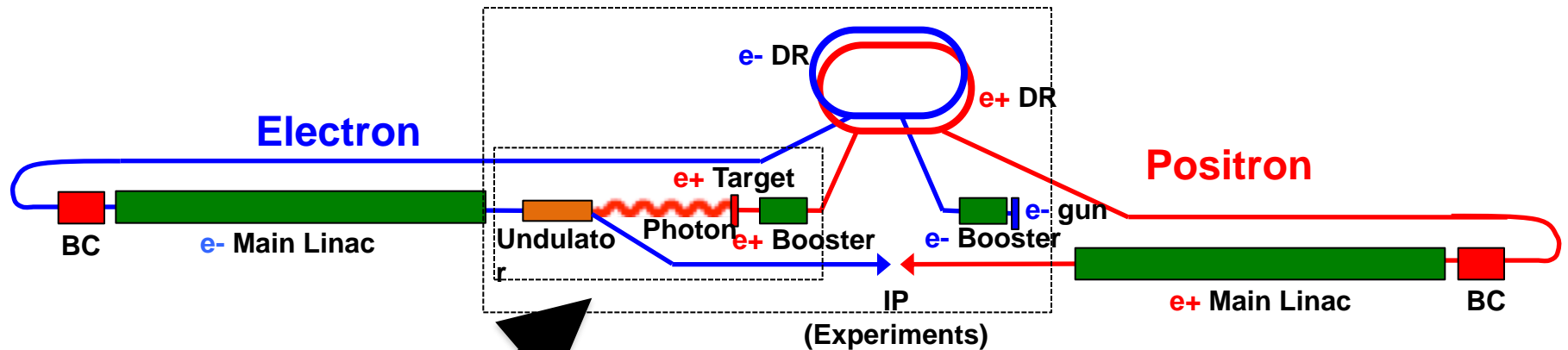
One more thing

3. The conventional source removes the difficulty of the commissioning with the undulator source. With the conventional source, we can make **full commissioning** of the central region, one and half year before the finish of main linac construction. (TDR Vol.3 Part II, page 244, Fig. 14.3)
We need not wait the e- main linac.

Appendix

Commissioning Issues

ILC Undulator-based e^+ Source



Later commissioning

We only able to make the **full commissioning** of e^+ source, e^+ DR, and e^+ booster, after finishing the commissioning of full electron system including e^- main linac.

TDR assumes earlier commissioning for the central part (sources, DRs, boosters). But, it will be commissioning with $<1\%$ intensity beam by the auxiliary source.

Commissioning Plan in TDR

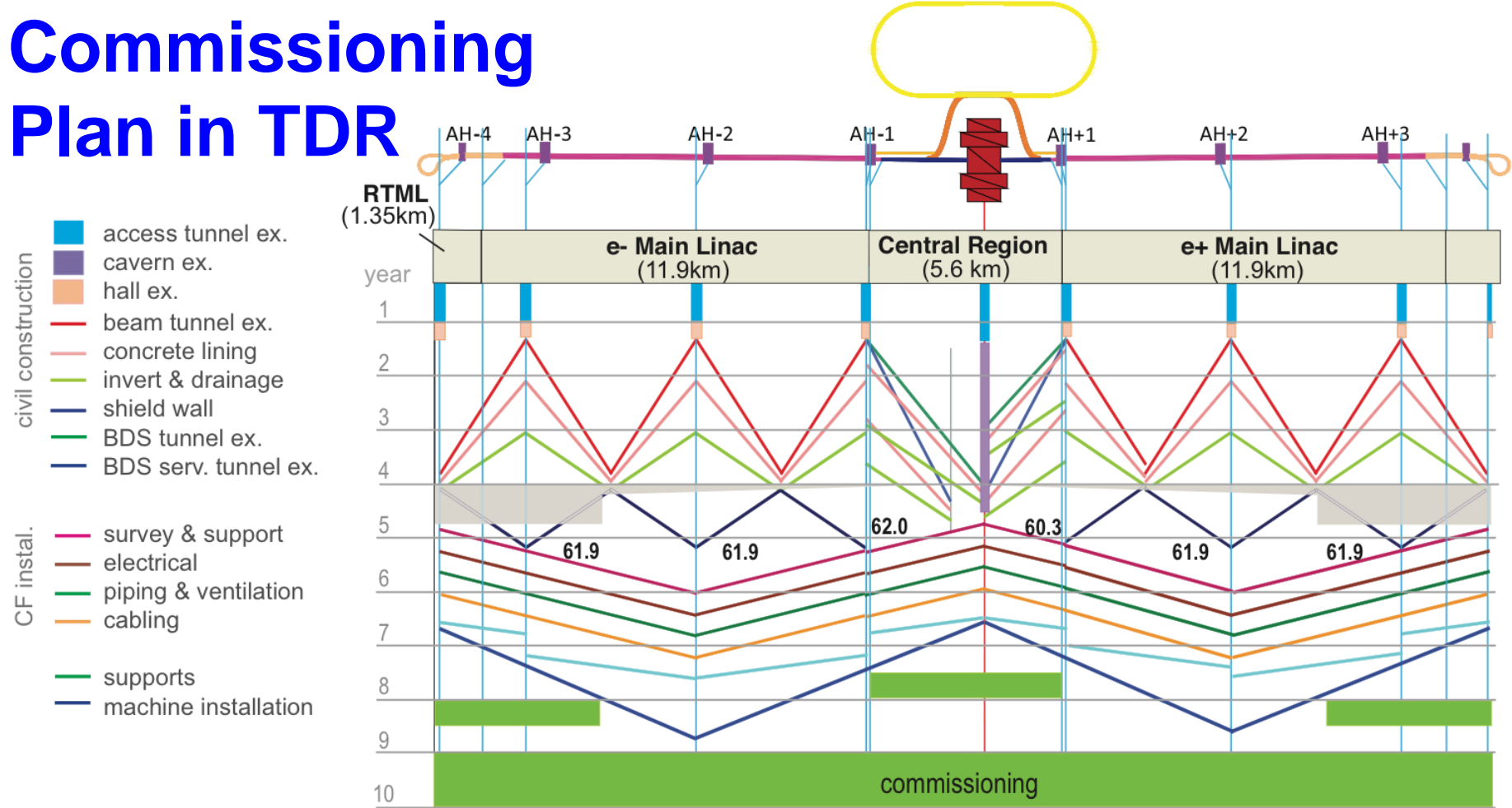


Figure 14.3. The construction and commissioning schedule for the mountain topography design variant. See Fig. 14.2 caption for details.

Are undulator e+ source and the commissioning plan in TDR consistent ?
→ Maybe not: We can make the commissioning with <1% intensity beam by the auxiliary source. But we only able to make the full commissioning of e+ source, e+ DR, and e+ booster, after finishing the commissioning of full electron system including e- main linac.