

Report from Daresbury e+ Meeting (29-31/Oct)

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Euro-Japan phone meeting**



ILC Requirements

- E_{cm} adjustable from 200 – 500 GeV
- Luminosity: $\int L dt = 500 \text{ fb}^{-1}$ in 4 years
 - **Peak at max. energy of $2 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$**
 - **Assume $1/\gamma$ L scaling for <500 GeV**
- Energy stability and precision below 0.1%
- Electron polarization of at least 80%
- The machine must be upgradeable to 1 TeV
- Two detectors
 - **Single IR in push-pull configuration**
 - **Detector change-over in not more than 1 week**

ILCSC
Parameters
group



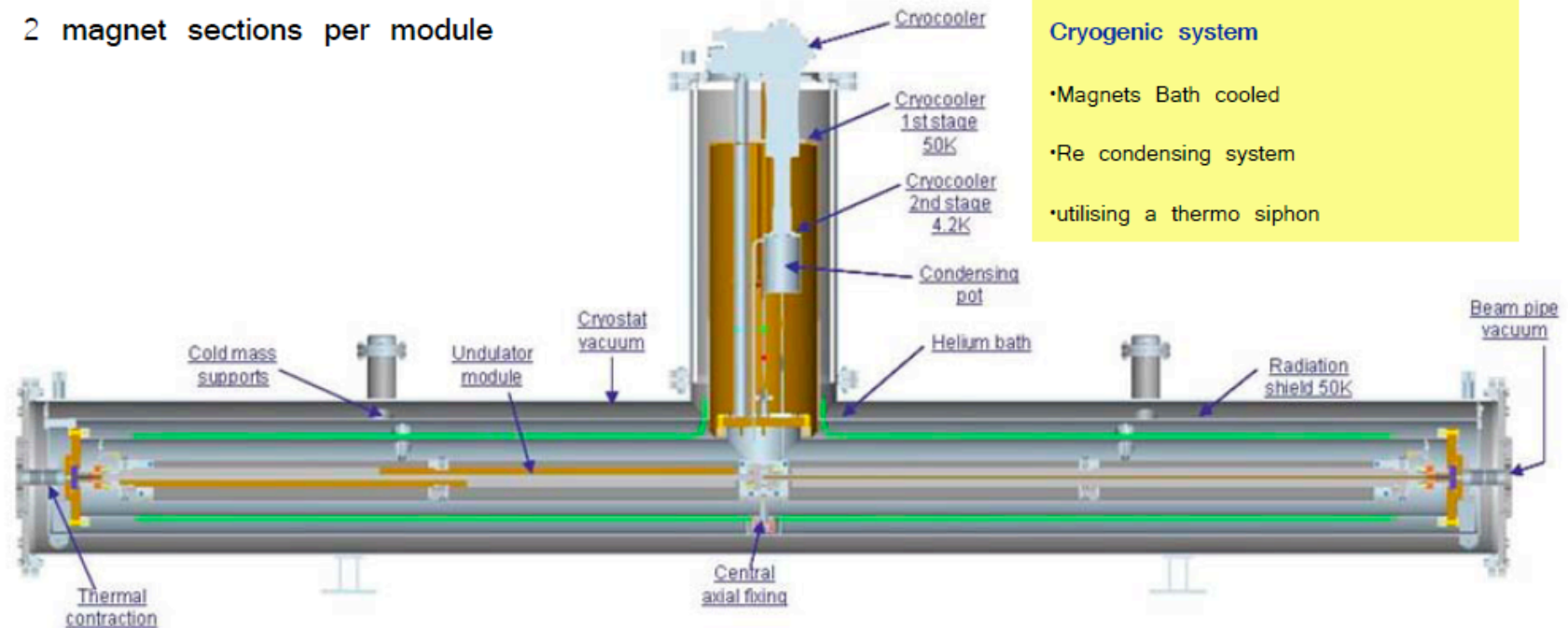
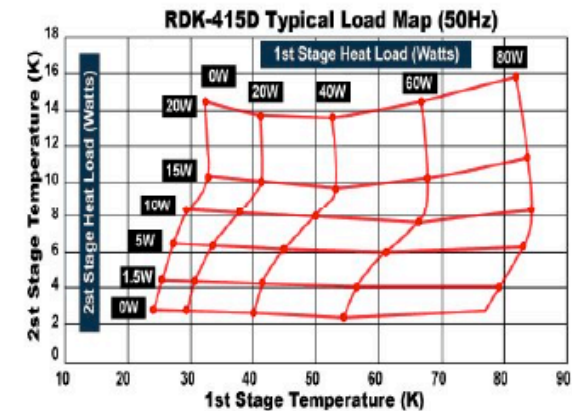
Central Region Integration

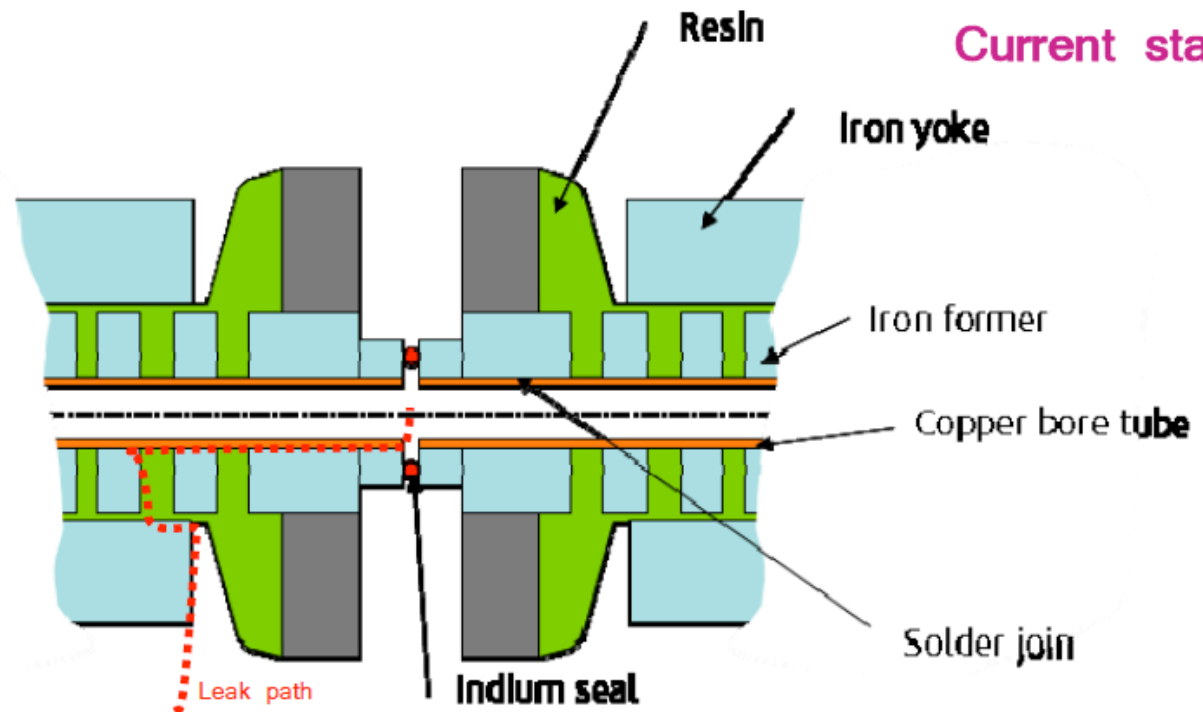
- Undulator-based positron source moved to end of linac (250 GeV point)
- e+ and e- sources share same tunnel as BDS
 - upstream BDS (optimised integration)
 - Including 5GeV injector linacs
- Removal of RDR “Keep Alive Source”
 - replace by few % ‘auxiliary’ source using main (photon) target
 - 500 MV warm linac, also in same tunnel
- Damping Rings
 - in BDS plane but horizontally displaced to avoid IR Hall
 - Injection/Ejection in same straight section
 - Circumference
 - 6.4 km (current RDR baseline)
 - 3.2 km (possible low-P option)

} alternative options

- 150m of undulator
- Module length
 - Vacuum considerations <4m
 - Collimation <4m
 - Magnet R&D 2m section realistic
- Minimise number of modules
 - 2 magnet sections per module

4m Prototype





Current status

Suspected leak path

The leak is strange

Not at a normal interface

Leak rate $2e-4$
 level on magnet 1

Seems to be through the magnet torturous path through resin along copper bore to point where the magnets join

Have some ideas on how to fix this

Leak rate $2e-7$
 level on magnet 2

There is a possibility that the bore tube has ruptured somewhere, this is really bad news! but the delay times in the leak response indicate the solder leak is much more probable

Following a pretty extensive **R&D programme** and **modelling study** the following specification was developed for the undulators:

Undulator Period		11.5 mm
Field on Axis		0.86 T
Peak field homogeneity	<1%	
Winding bore		>6mm
Undulator Length		147 m
Nominal current		215A
Critical current		~270A
Manufacturing tolerances		
	winding concentricity	20um
	winding tolerances	100um
	straightness	100um
NbTi wire Cu:Sc ratio	0.9	
Winding blocck		9 layers
		7 wire ribbon

This defines the shortest period undulator we could build with a realistic operating margin.