Conventional Facility

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1. Status of our Studies on CF

- The “GLC version” of our CF studies have been published as Chapter 5 of “GLC Roadmap Report” (KEK 2003-7). Work is currently in progress to rewrite it in accordance with the machine scheme of SRF-based ILC. Specifically,
- Our current work assumes 1 TeV ILC to fit within a 45 km-long site footprint. A good progress is being made and we are not seeing any major show-stoppers.
- Besides preparing site-independent CF specifications, we have started looking into a case with a specific sample site.

2. From the Normal- to Superconducting LC facilities

- New topics
  - Facility parameters for 35 MV/m
  - Accelerator layout
  - Facility layout
  - Cryogenic system
  - Tunnel and shaft layouts
- In particular, the single- vs double-tunnel issue
  - Cost
  - Personnel safety
  - Machine start up

3. At Snowmass

- We have to spend time discussing on:
  - Baseline reference parameters for the facilities
  - 1 or 2 tunnels issue
  - General layout of the accelerator and the facilities both underground and surface.

- We have to start organizing ourselves for studies of common subjects
  - Safety laws, personnel and equipment.
  - Civil engineering regulations.
  - Guidelines for our interactions with the industry.
  - And more.

Supplements

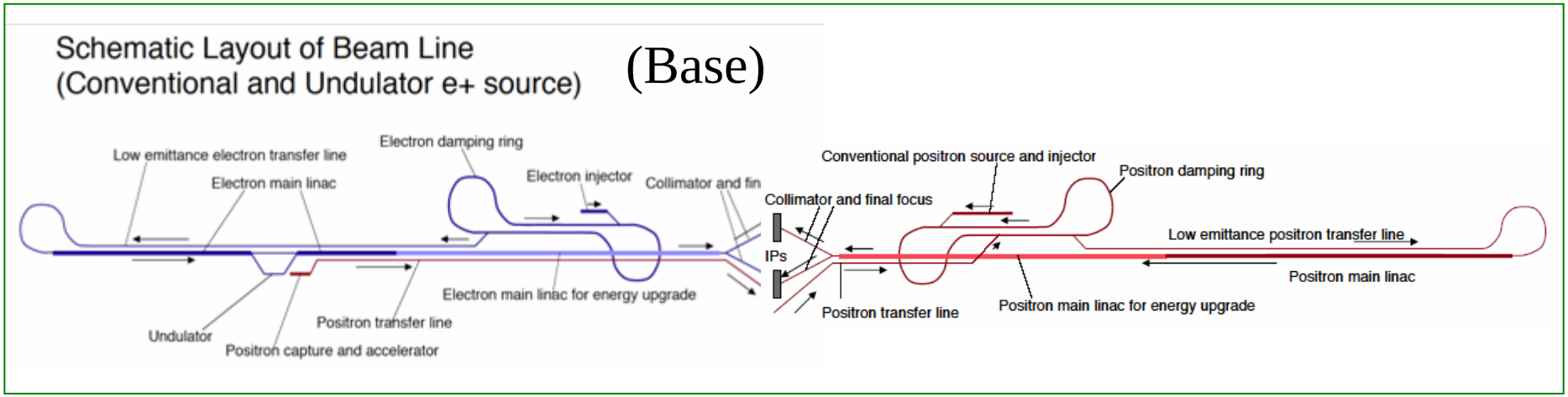
2-1. Major CF Parameters
- 1 TeV, 35 MV/m -

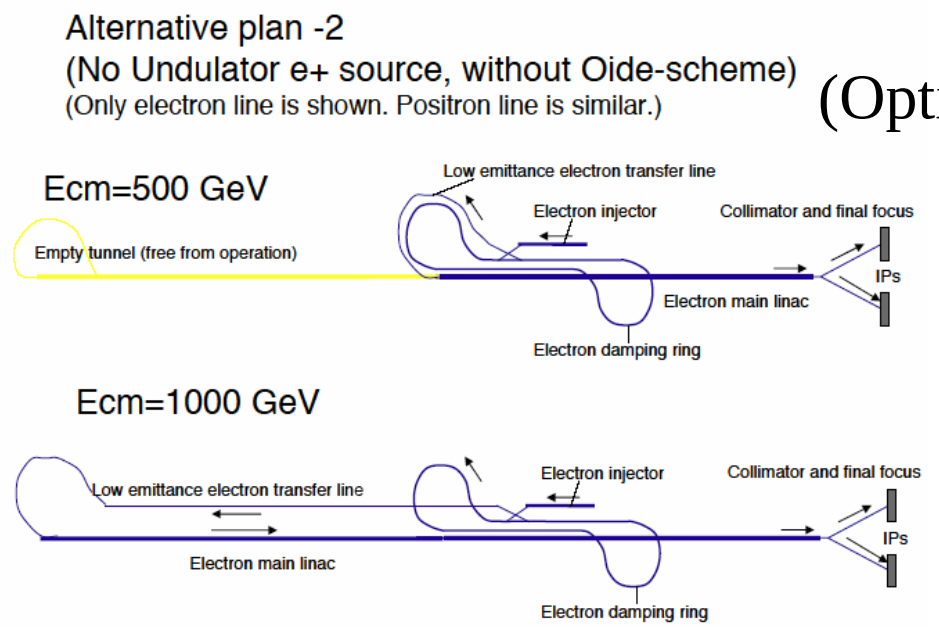
Accelerator Energy	1 TeV
Accelerator gain	35 MV/m
Total linac length (active length / 0.7)	40.4 km
Cavity length, R/Q	1.038 m *, 1.036 Ω *
Energy gain /cavity	36.32 MeV
Total number of cavities (5% spears	28,640
Number of cavities/cryomodule	10
Length of cryomodule	15 m
Number of modiles/klystron	2
Total number of klystrons	1,432

Klystron peak power (10 % overhead for tuning included)	9.17 MW
Total average RF power (10 % overhead for tuning included)	91.4 MW
AC power for RF (efficiency 47%, overhead 10%)	195MW
Total average beam power	51 MW
Total heat load	602 kW
AC power for cryogenics	52 MW
Total AC power for Main Linacs	247 MW
Total site AC power	322 MW

- Baseline reference parameters for CF must be established.

2-2. Accelerator Layout





Attractive in

- lower initial cost
- continual experiment during extension to 1 TeV

2-3. CF overall layout

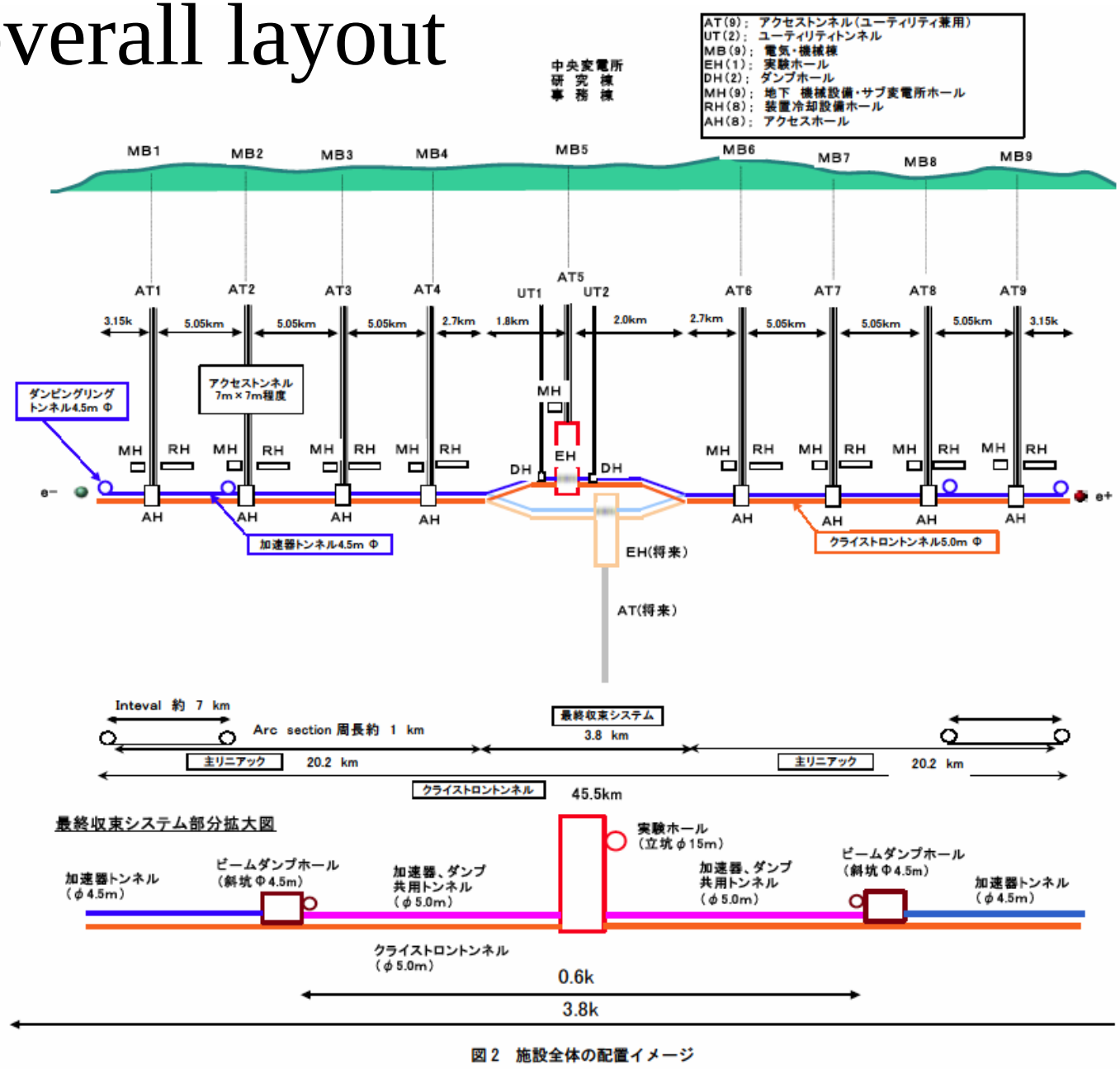
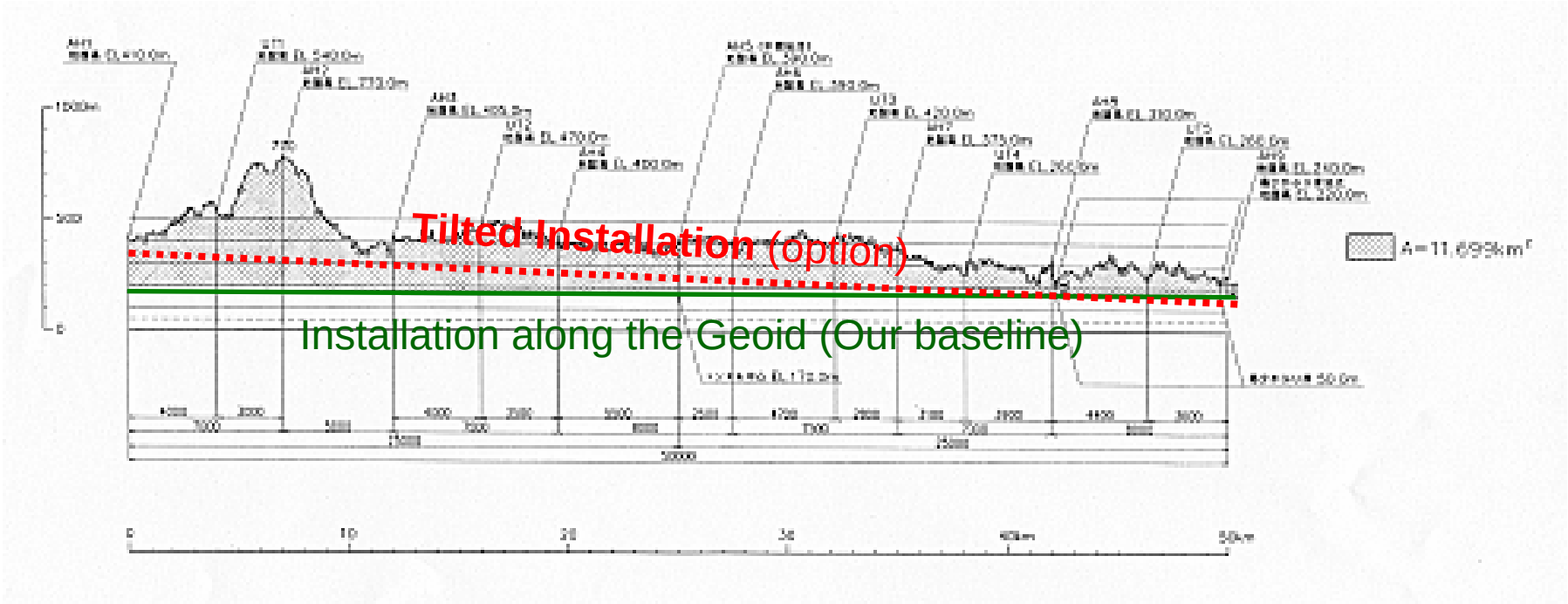


図2 施設全体の配置イメージ

2-3. CF overall layout (continued)



2-4. Cryogenic Systems

Heat Load of Cryogenic System

	Static (kW)	Dynamic (kW)	Total (kW)	Total Electric Power (MW)
2K	15	38	53	31
5-8K	52	14	66	11
40-80K	310	272	582	10

Total 52 MW

Refrigeration System

8 Stations

1 Station 6.5 MW

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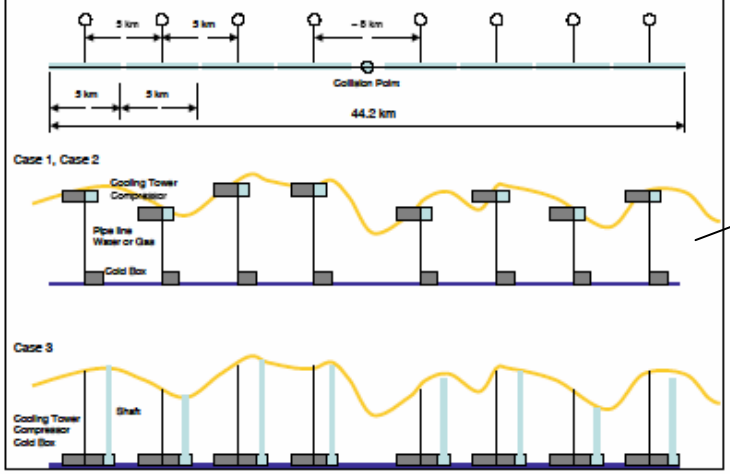
Layout of Cryogenic Stations



Cooling Water & Power

Heat Load 6.5 MW / 1 station (Helium Gas Compressor)

Supply Water (1 MW Load 1.6 m^3/hr)

1 Station 6.5 MW 10.4 m^3/hr
8 Stations (Total) 83.2 m^3/hr

Mass Flow Rate (Cooling Tower – Compressor) (32ºC – 37ºC)

1 Station 1150 m^3/hr
8 Stations (Total) 9200 m^3/hr

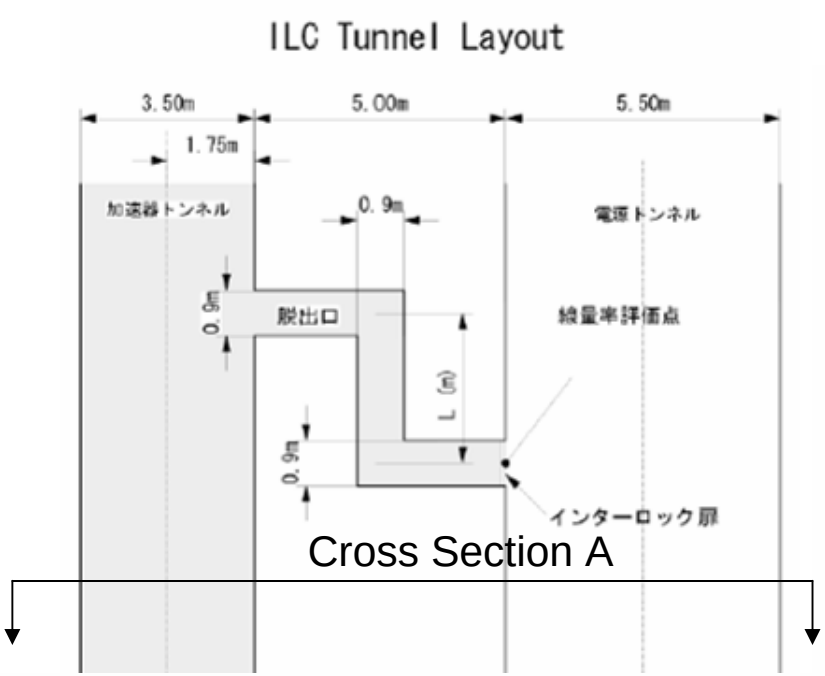
Cooling Water and Additional Compressor Power

	L= 10 m (MW)	L= 1 km (MW)		L= 2 km (MW)	
	Cooling Tower	Case 1	Case 2	Case 1	Case 2
1 Station	0.44	0.45	0.52	0.46	0.60
8 Stations	3.6	3.6	4.1	3.7	4.8

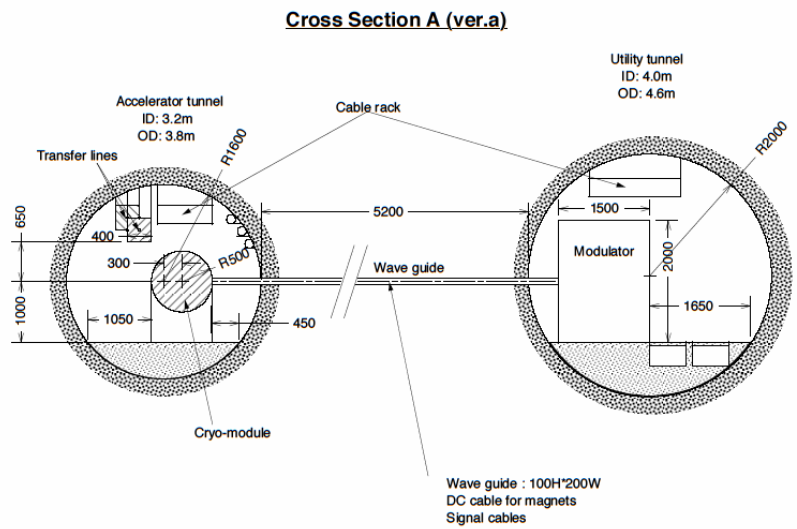
Case 1 Cooling Tower : surface + Compressor & Cold Box : tunnel
Case 2 Cooling Tower & Compressor : surface + Cold Box : tunnel
Case 3 Cooling Tower & Compressor & Cold Box : tunnel Only Cooling Tower

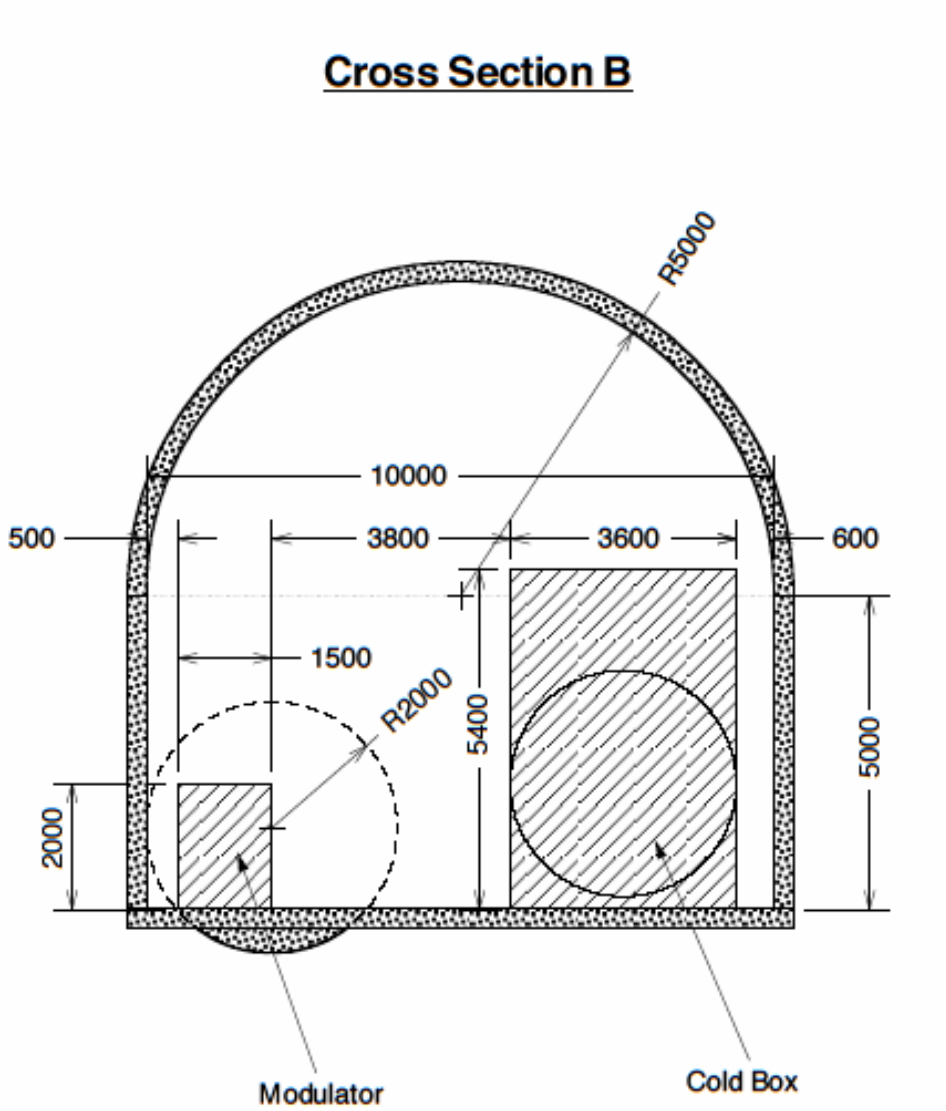
(Our baseline scheme)

2-5. Accelerator Tunnels

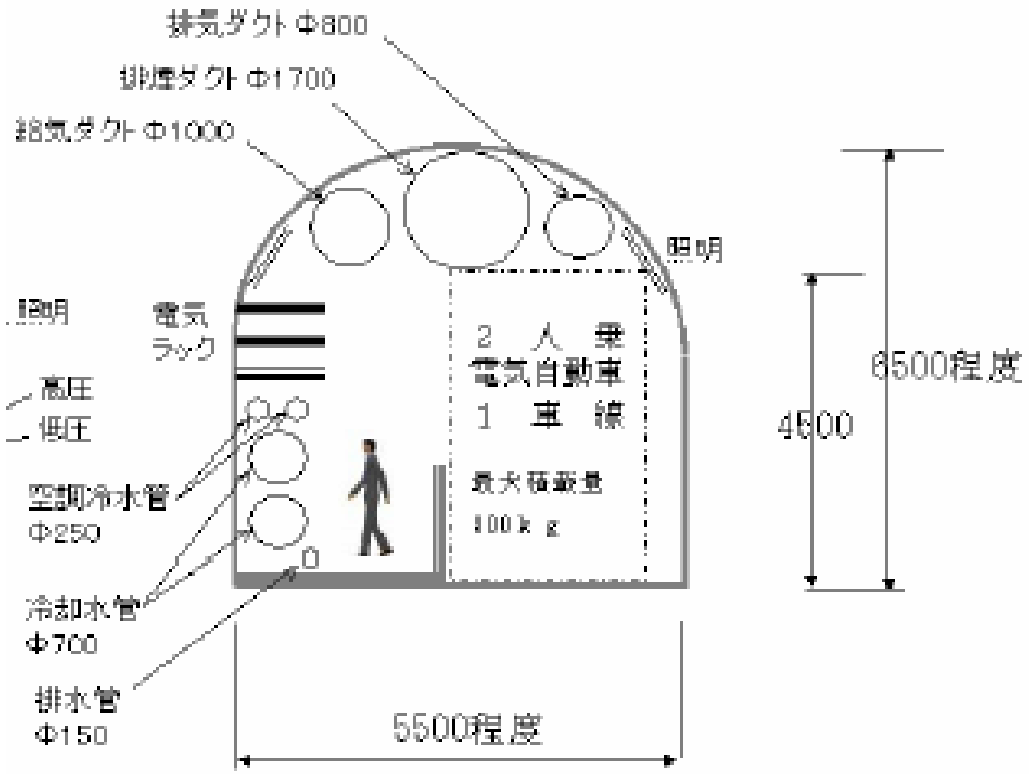


Cross Section A



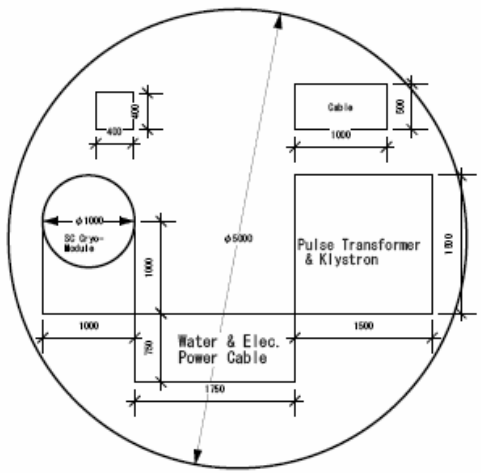


2-5. Access Tunnels



Tentative. The tunnel size and the inside layout are under study.

2-6. Single- vs Double-Tunnel Issue



We have to study and agree on:

- Cost comparisons (at Snowmass)
- Personnel safety
  - Single tunnel Careful fire protection (ref. TESLA TDR)
  - Double tunnel Either one used as a shelter (supposed the accelerator tunnel is the shelter).
- Machine start-up
  - Single tunnel Maintenance, Radiation (ref. TESLA TDR)
  - RF persons have to discussed in detail.

CF activity (June 2005)