

ESS CM Requirements

2.5 GeV Proton 2.86 ms pulse at 14 Hz Availability > 95%

- ✓ Transfer energy to beam;
- ✓ Confine proton longitudinally;
- ✓ Steer proton longitudinally.

	Length (m)	Input Energy (MeV)	Frequency (MHz)	Geometric β	# of Sections	Temp (K)
RFQ	4.7	75×10^{-3}	352.2	--	1	≈ 300
DTL	19	3	352.2	--	3	≈ 300
Spoke	58	50	352.2	0.57	14 (2c)	≈ 2
Low Beta	108	188	704.4	0.70	16 (4c)	≈ 2
High Beta	196	606	704.4	0.90	15 (8c)	≈ 2
HEBT	100	2500	--	--	--	--

ESS CM Requirements (Criteria, Performance for interfacing to external systems

1. Operating temperature : 2K
2. Coupler: 1 MW (ultimate 2 MW)
3. MAWP He tank / Nb cavity < 6 bar / 2 bar warm
4. Cavity operating pressure stability ~ 1 mbar
5. Alignment: better than 0.3%
6. Use magnetic shielding

ESS CM Requirements

7. Radiation Hard Equipment, ALARA
8. Systems are safe for personal and equipment
9. Implement Diagnostic instrumentation
10. Operating cost lower than 10^8 euro → Limit static heat low to minimize energy consumption
11. Cooling Architecture → Modularity to optimize Reliability, Availability, Maintainability