

P7-8: Conceptual Design of the DEMO EC-System: main Developments and R&D Achievements - *G.Granucci et al*

EC System for DEMO has been conceptually designed on the basis of assigned Tasks:

EC Task	Power [MW]	Localization [ρ]	Mode
Assisted Breakdown	6-10	< 0.3	Heating
Ramp up and L-H transition	50*	< 0.3	Heating/CD
Main heating	50	< 0.3	Heating/CD
Sawtooth control	2	0.3	CD
NTM control ($q=2$; $q=3/2$)	10-15	0.85; 0.75	CD
Ramp down	40*	0.3 - 0.5	Heating

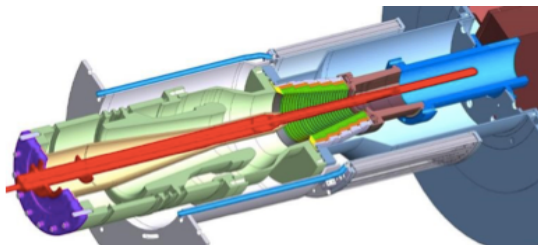
* The total powers for Ramp up and Ramp down are larger, the value in the table assumed that the whole design value for ECW (50 MW) will be affected to these functions

R&D and Advanced Developments on Multi-purpose (multi-frequency) and frequency step-tunable gyrotrons.

The principle feasibility of:

- 236 GHz, 1 MW CW conventional-cavity
- 238 GHz, 2 MW CW coaxial-cavity gyrotron

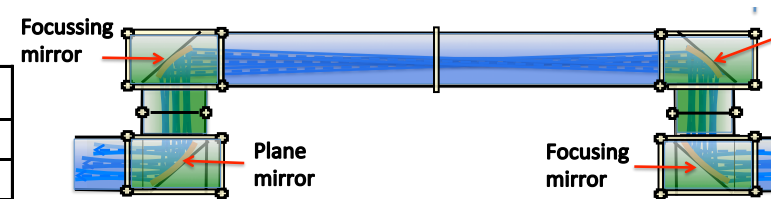
are under investigation together with the development of a synthetic diamond Brewster-angle window technology and advanced developments in the field of multi-stage depressed collector technologies.



Coaxial-cavity gyrotron



Brewster Angle Window



Evacuated Quasi Optical TL

Subsystems under present studies :

- Launcher: **Remote Steering Antenna.**
Dedicated beam tracing calculations, the deposition locations coverage and the wave absorption efficiency have been investigated, considering a selection of frequencies, injection angles and launching points
- Transmission Line: **Evacuated Quasi Optical Multi-beam**
- EC system proposed in **cluster**
- Target **System Reliability : 100%**