

Fusion Power Plant Tritium Production and Recovery

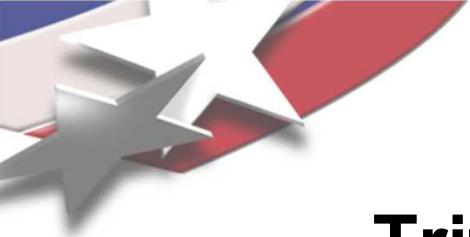
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Tritium Production and Recovery

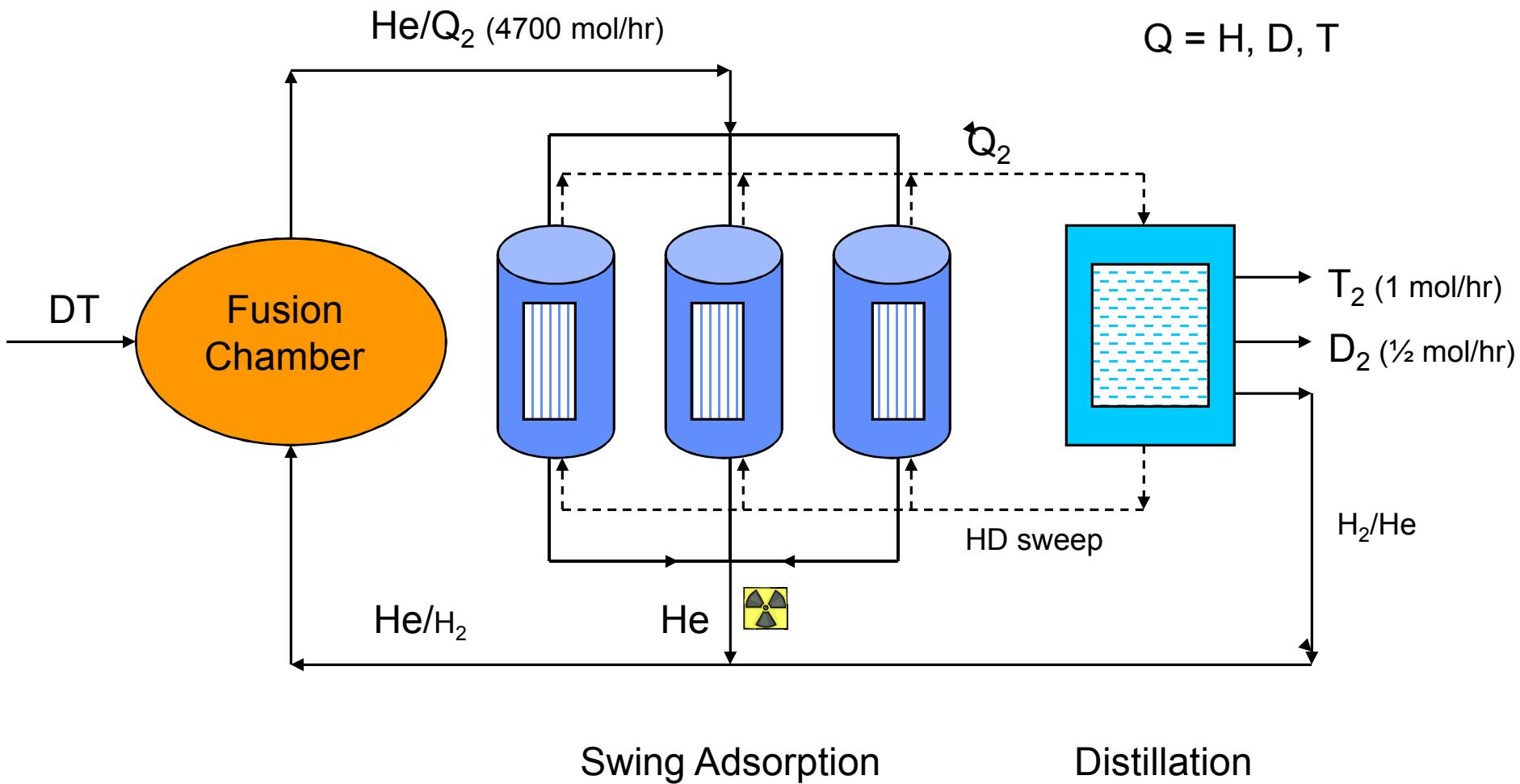
- Z-Pinch Inertial Fusion Energy Basic Assumptions:
 - 3 GJ/capsule yield
 - 27 mg DT/capsule (burn efficiency of 1/3)
 - 1:1 ratio of D to T
 - TBR of 1.1 (FLiBe)
 - One chamber, 6 shots/min
- Net Tritium Supplied and Recovered:
 - 140 g/day supplied to chamber
 - 145 g/day recovered from system



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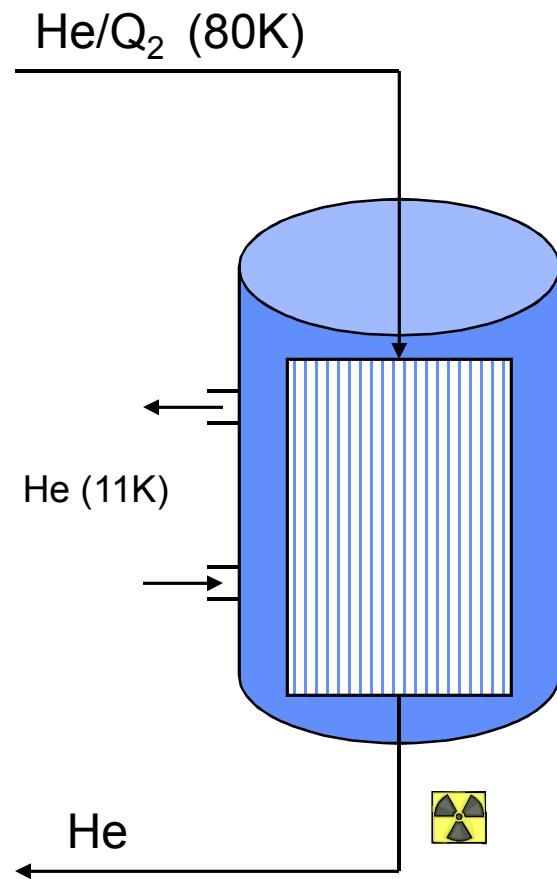
- Tritium Recovery Methods from Coolant
 - Use helium with 0.01% hydrogen
 - Secondary recovery from steel processing (H_2O)
- Purification and Storage
 - Cryogenic swing adsorption (separate He)
 - Cryogenic distillation (separate H, D, T)
 - Hydride beds (D, T storage and purification >99.5%)
- 2005 Goals
 - Select a recovery system and begin mass/energy balance calculations and cost

Tritium Production and Recovery

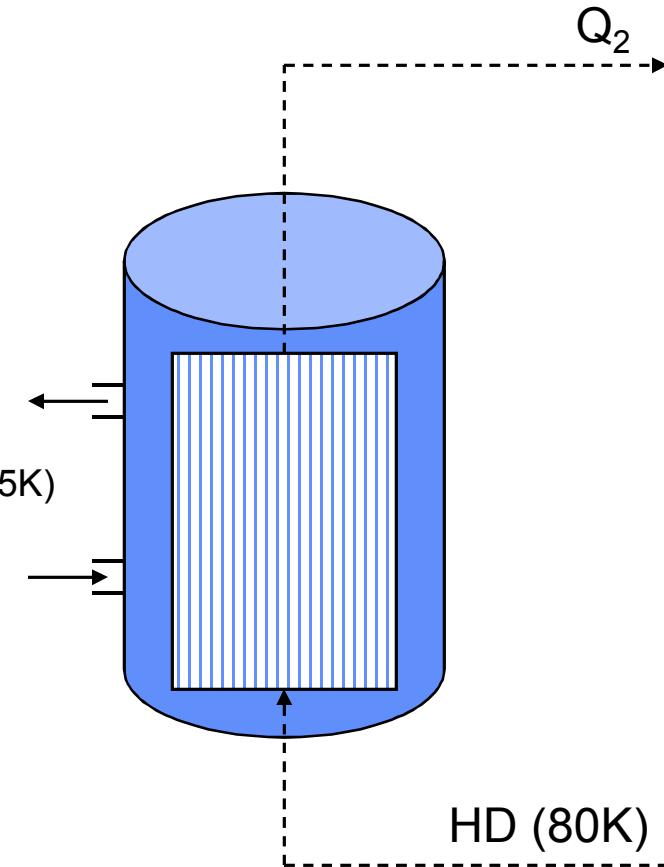




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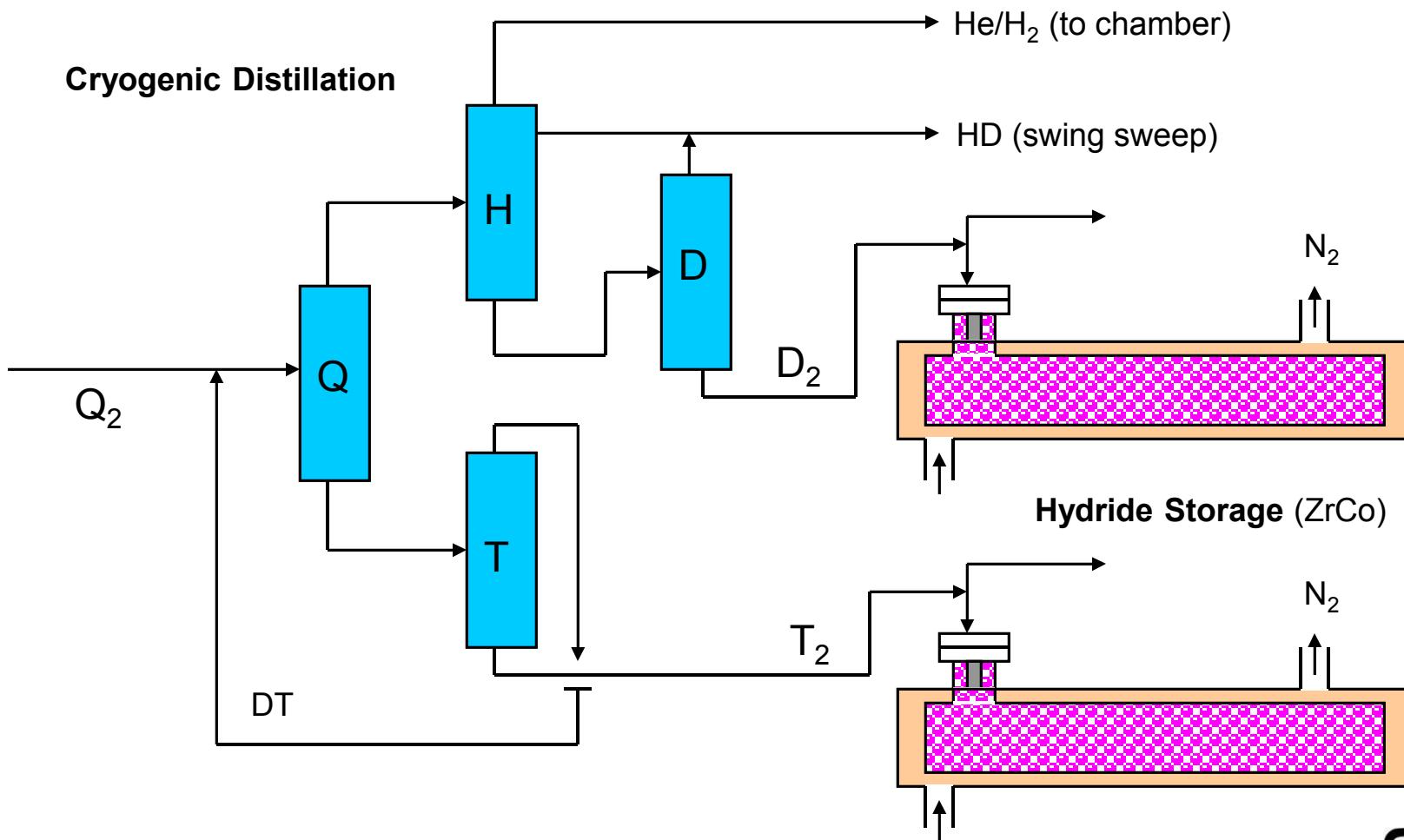
Adsorb (Freeze)



Desorb (Vaporize)

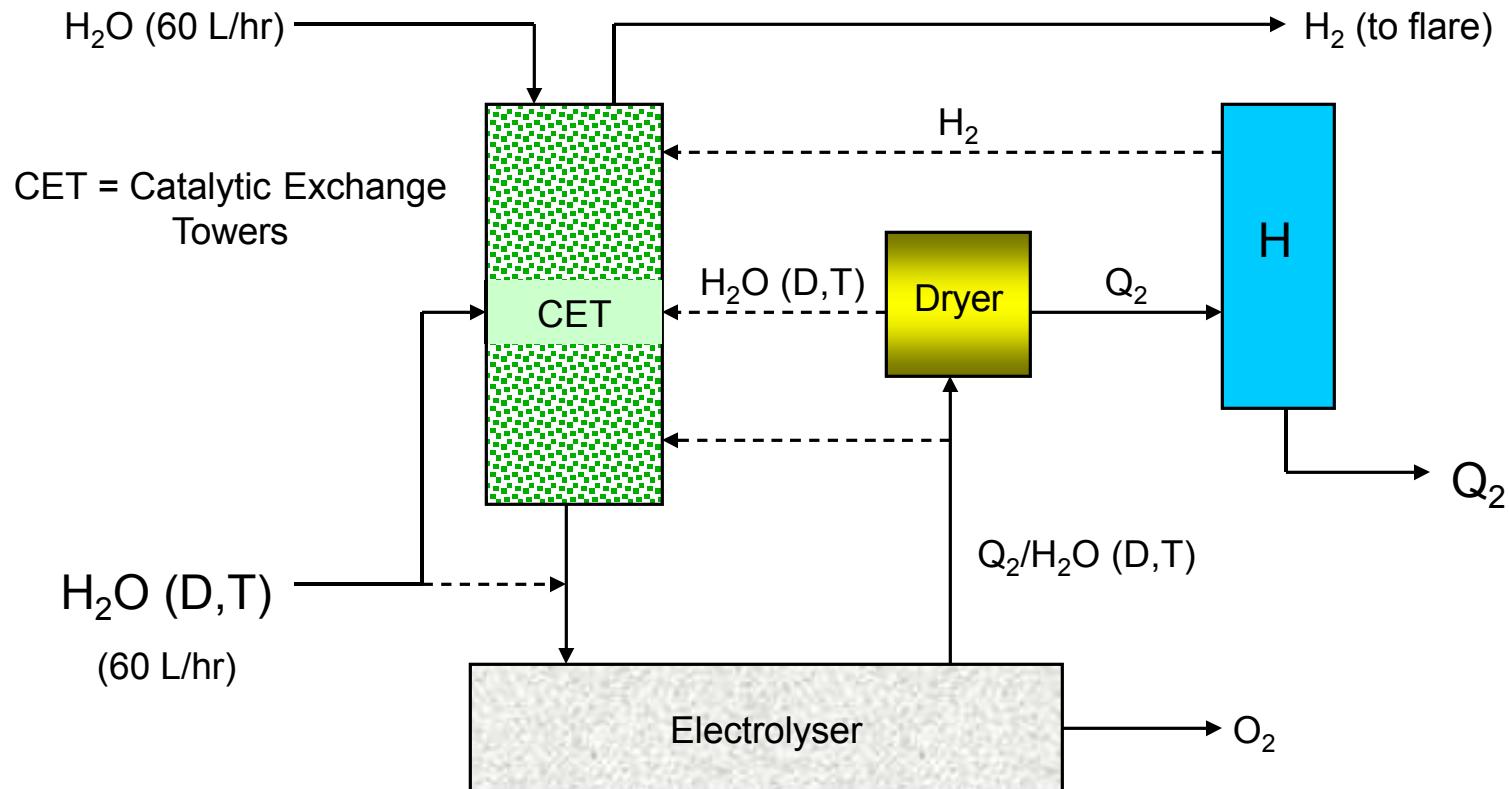
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Cryogenic Distillation



Modified from LANL Tritium Separation Test Assembly and SRS figures.

Tritium Production and Recovery



Modified from A.N. Perevezentsev, et al., Development of a water detritiation facility for JET, Fusion Eng Des (2002) and ITER Technical Basis, Tritium Plant and Detritiation, Chapter 3.1 (2005).

