

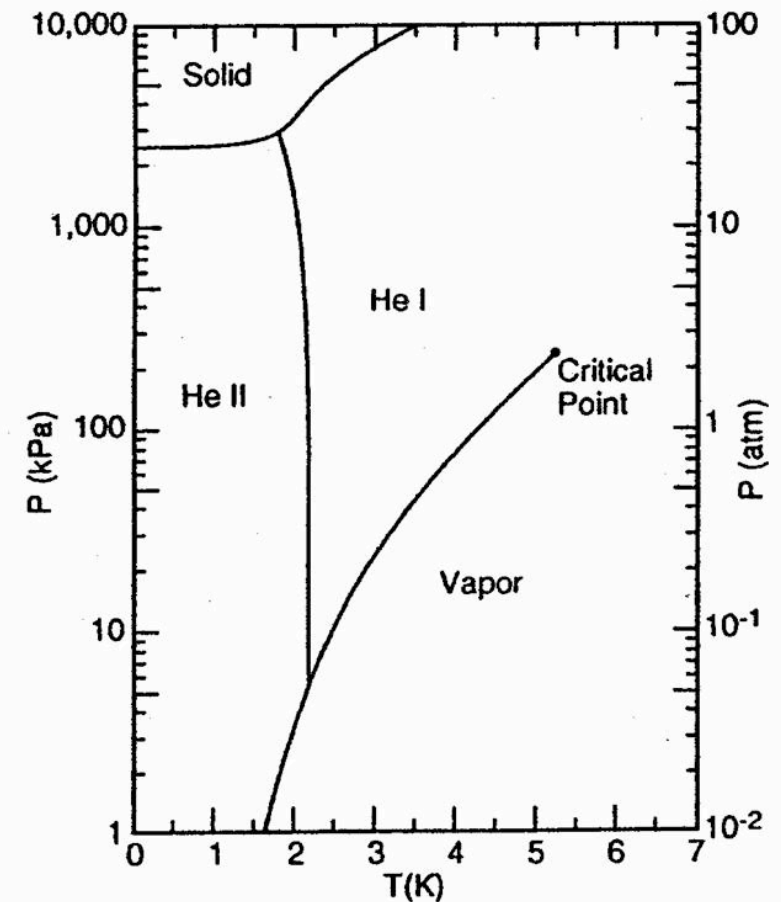


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Cooling the Superconductors

- Cooling below 2K requires the use of liquid He II
- Lambda point occurs at 2.1768 K
- He II best described with two-fluid model
 - He I (normal liquid)
 - He II (superfluid)



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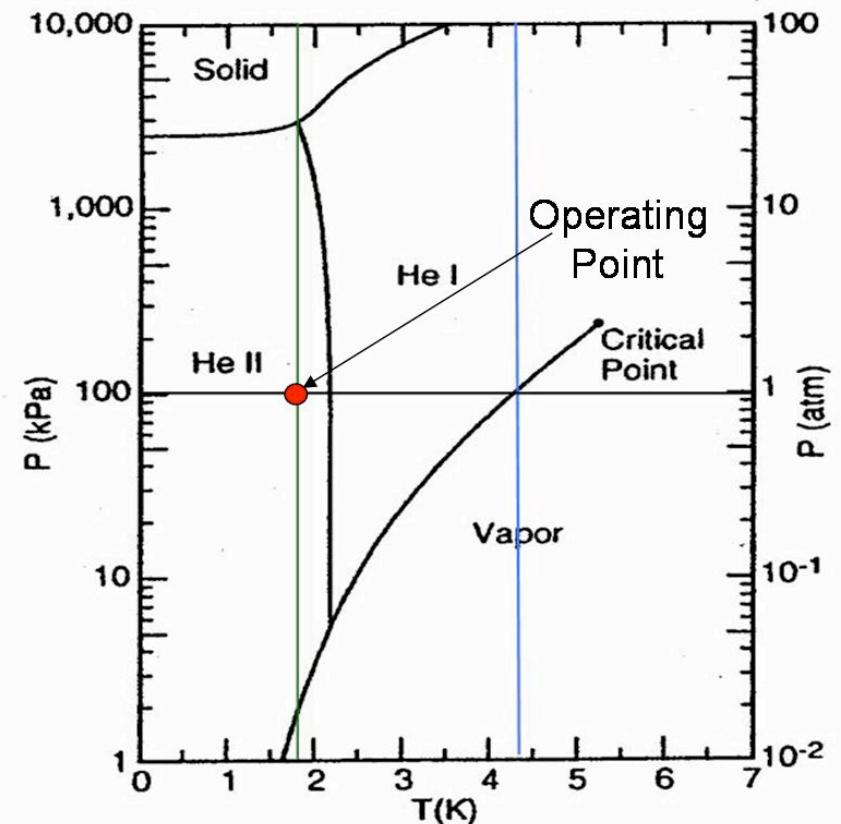


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Sub-cooled He II

- Saturated He II leads to normal helium vapor
- He vapor's poor thermal conductivity results in large local temperature rise
- Best to operate in sub-cooled He II region
- Optimal superconductor coolant
 - Matches required temperature
 - Can absorb heat energy with minimal temperature fluctuations.



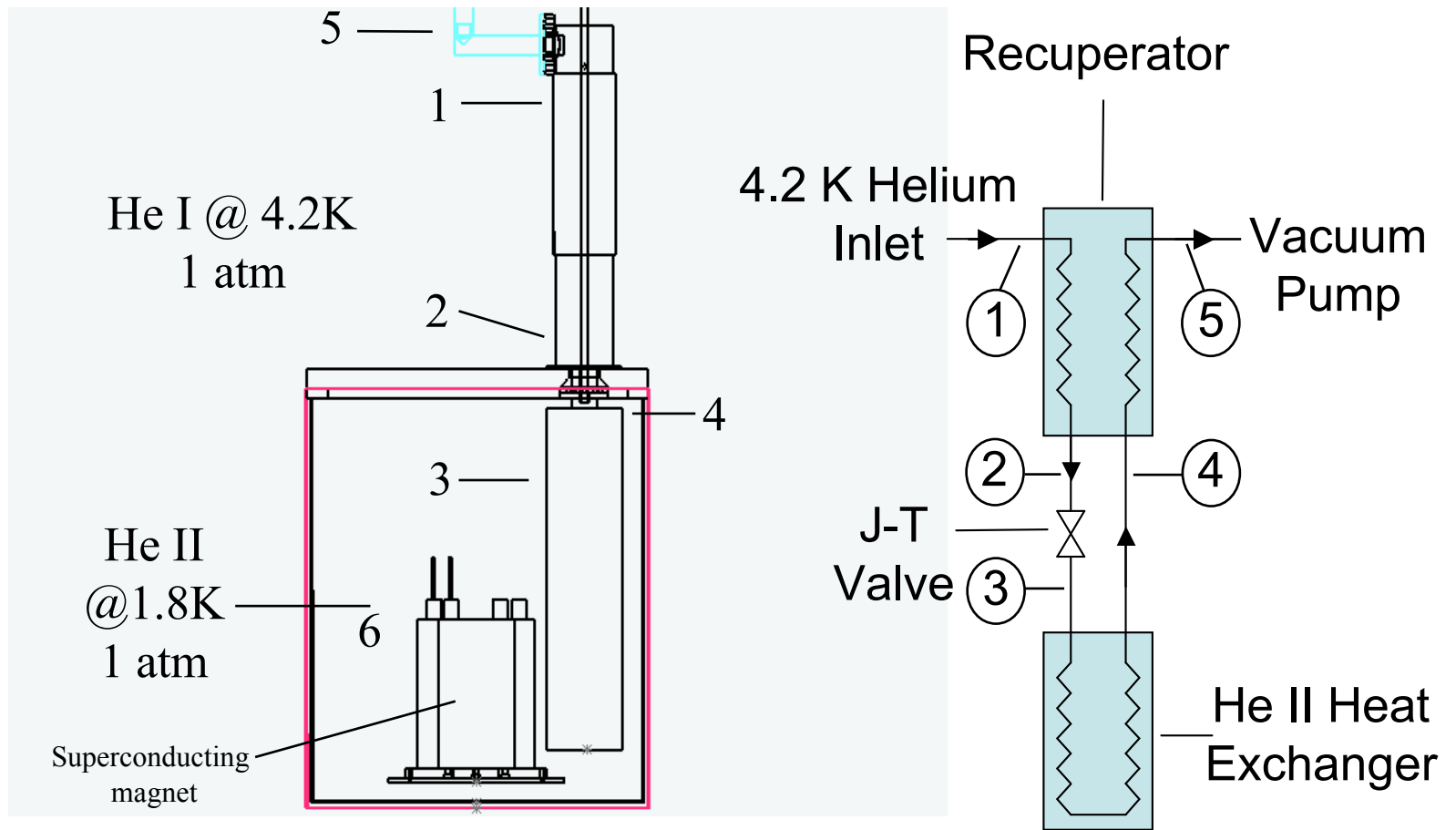
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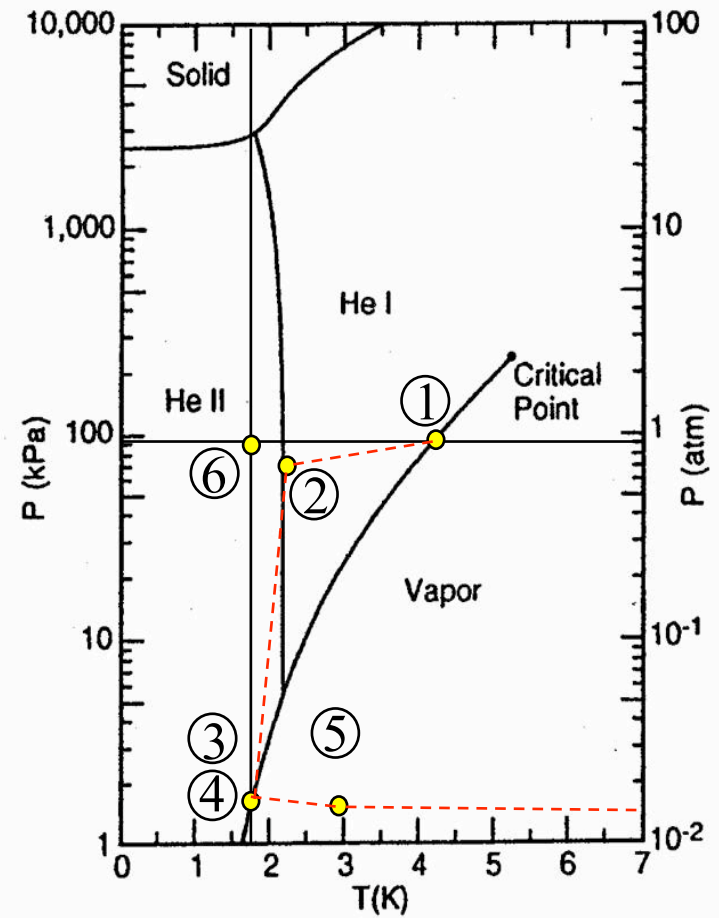
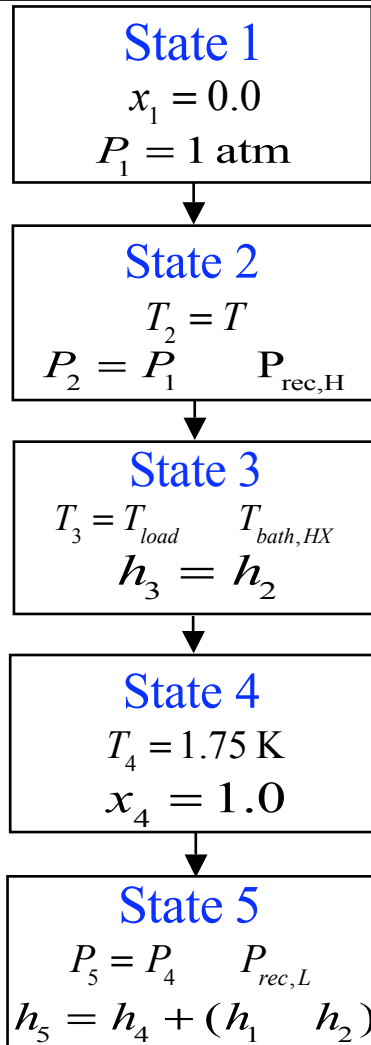
Helium Refrigeration Cycle



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Helium Refrigeration Cycle

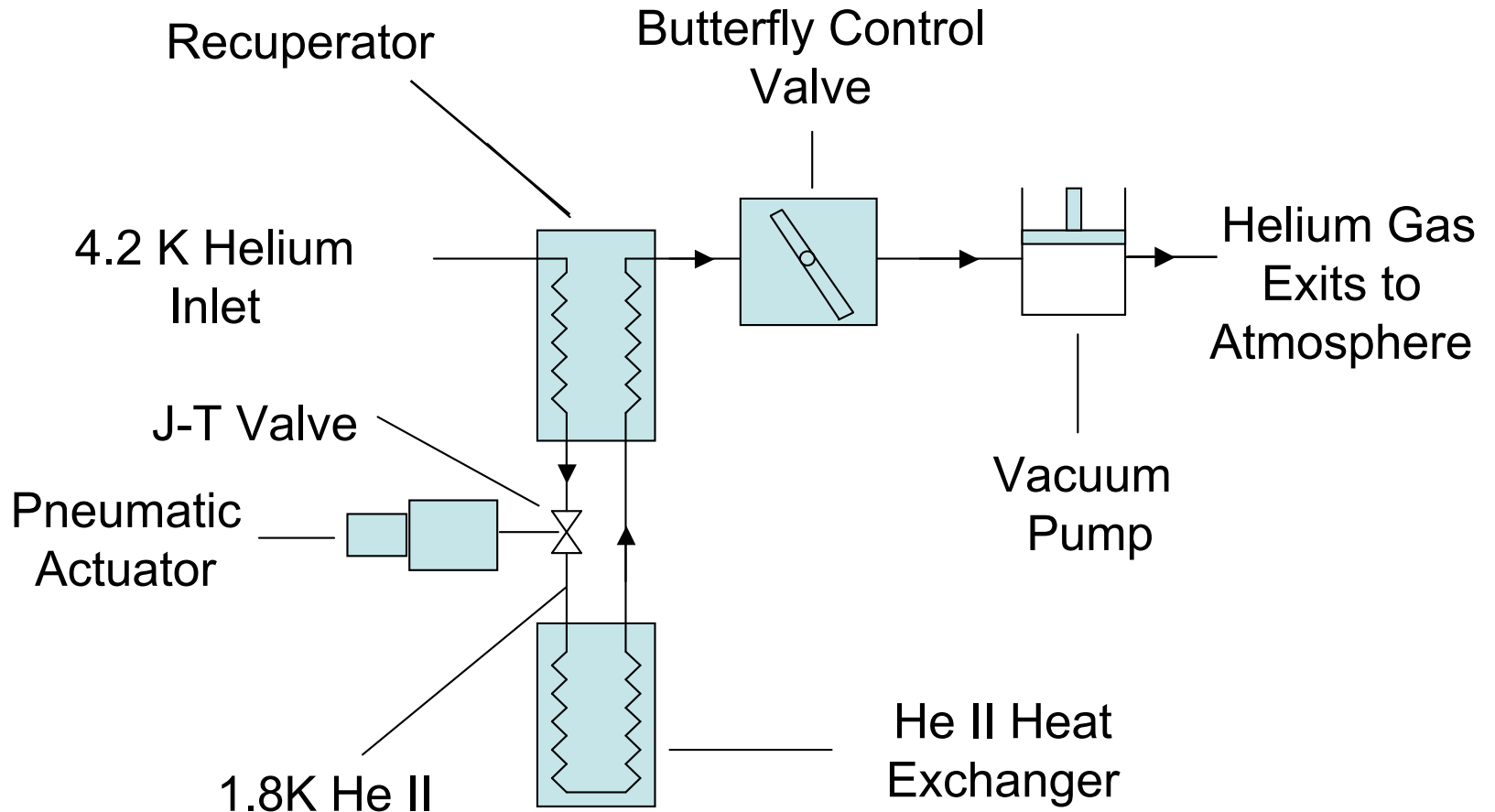




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Controlling Refrigeration System



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