Fusion Power Plants 101

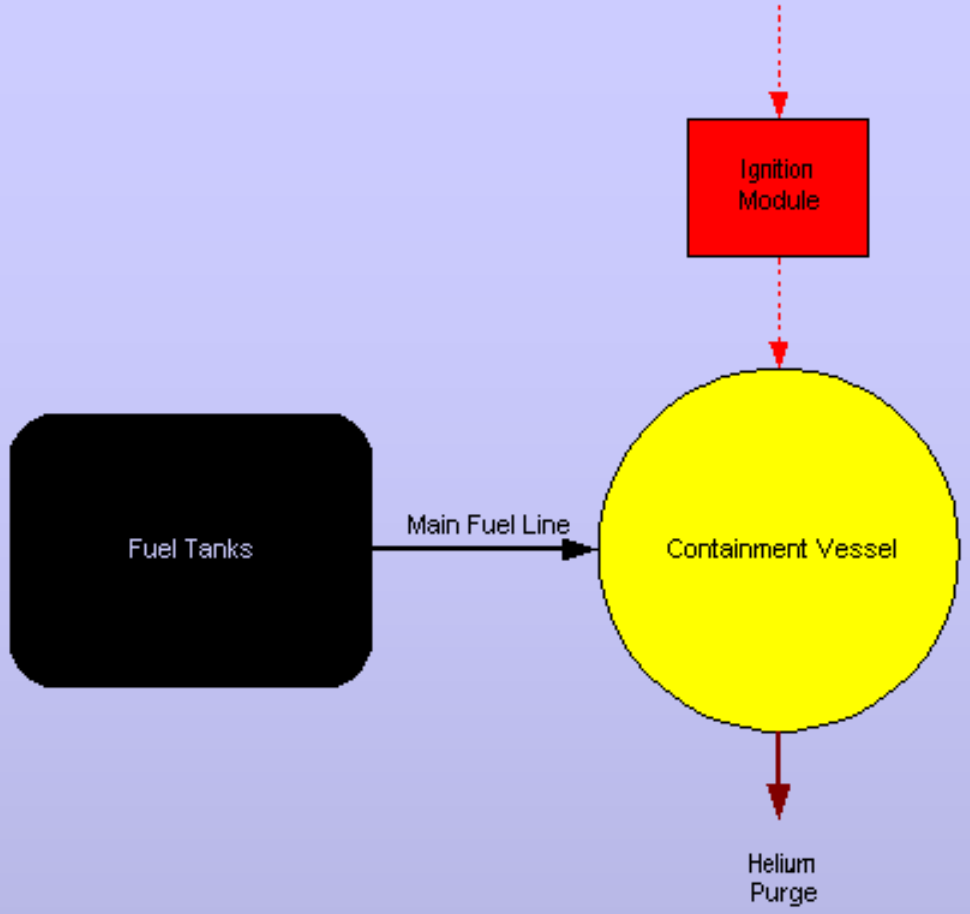
An Overview

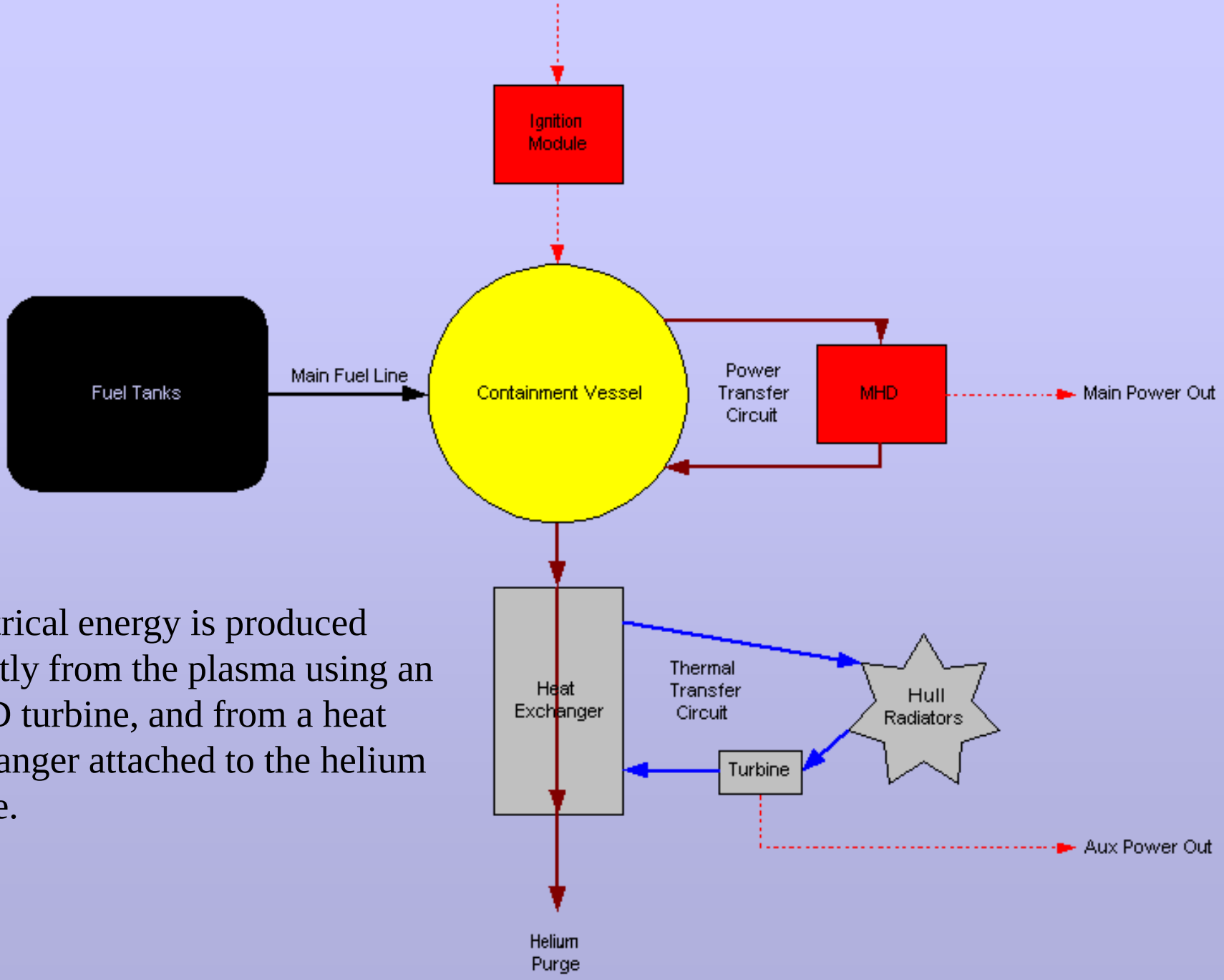
In a fusion power plant hydrogen fuel is pumped down the main fuel line into a containment vessel. There it is burnt, producing helium which is purged.

To burn hydrogen it must be superheated and ignited … once started it remains alight as long as fuel is available and containment is maintained.

The Ignition Module is combination capacitor and battery that delivers a massive electrical jolt.

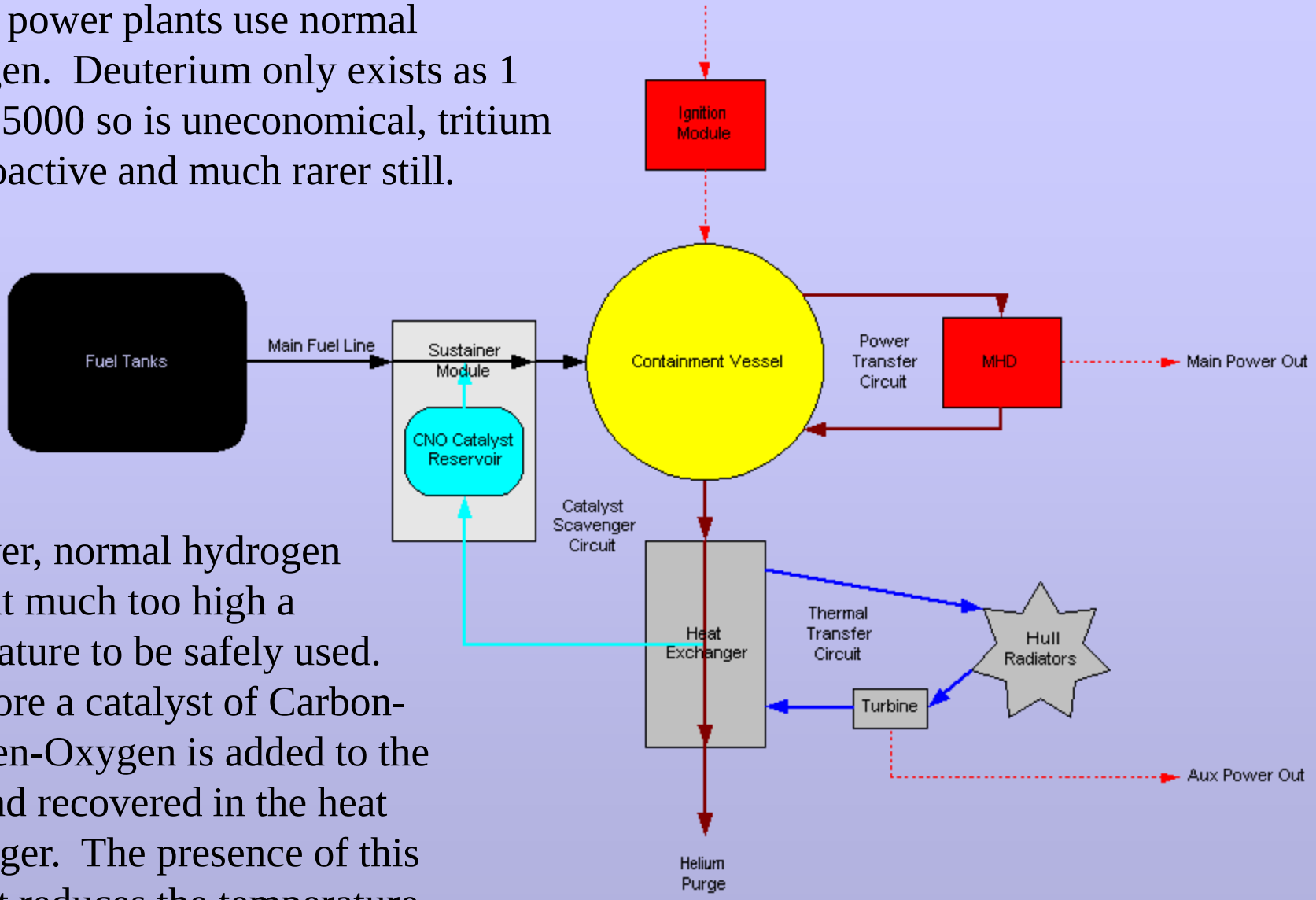
Containment is maintained by an array of superconductor magnets.



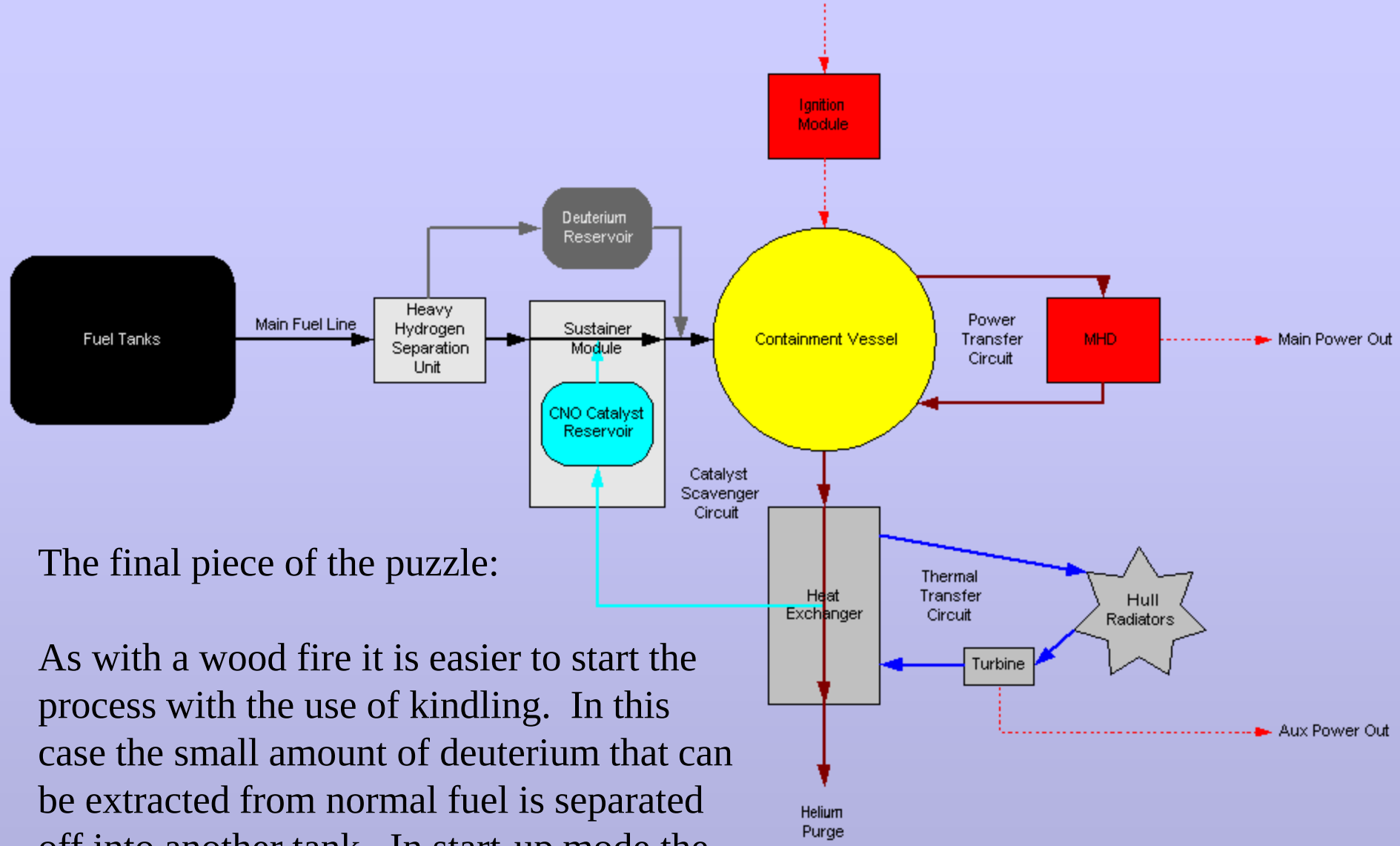


Electrical energy is produced directly from the plasma using an MHD turbine, and from a heat exchanger attached to the helium purge.

Fusion power plants use normal hydrogen. Deuterium only exists as 1 part in 5000 so is uneconomical, tritium is radioactive and much rarer still.



However, normal hydrogen burns at much too high a temperature to be safely used. Therefore a catalyst of Carbon-Nitrogen-Oxygen is added to the fuel, and recovered in the heat exchanger. The presence of this catalyst reduces the temperature threshold needed for fusion to occur.



The final piece of the puzzle:

As with a wood fire it is easier to start the process with the use of kindling. In this case the small amount of deuterium that can be extracted from normal fuel is separated off into another tank. In start-up mode the power plant is fuelled with deuterium rather than normal fuel plus catalyst.

Thus to start a fusion power plant the following is required:

- Fuel (hydrogen rich gas, water, etc)
- Deuterium
- CNO Catalyst
- Coolant
- A charged Ignition Module