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Integrated Physics Analysis of Plasma Operation Control Scenario of Helical Reactor FFHR-d1

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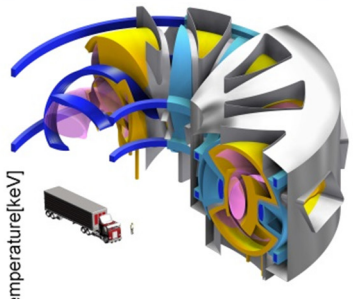

- Conceptual design of LHD-type helical fusion reactor FFHR-d1 has been advanced
  - Take full advantage of the characteristics of **net-current-free plasma** (no disruption, no current drive)
  - Detailed physics assessment of the core plasma and 3D CAD design have been carried out
- Plasma operation control scenario of FFHR-d1 has been discussed
  - **Stable control with a small number of simple diagnostics** can be realized (*by fuelling control based on line-averaged electron density and heating power control based on edge electron density and fusion power*)
  - **Startup scenario consistent with MHD equilibrium and neo-classical transport** can be achieved with adequate vertical field control
- More precise physics analysis is needed to confirm this scenario
  - MHD stability, alpha particle confinement, energy transfer from electrons to ions, etc.