Lecture 7: ITER's Physics and Technical Issues Today

AP 4990y Seminar Columbia University Spring, 2011

Topics:

- 2007 International Design Review
- My personal "issue priority list":
 - Superconducting magnet assembly and safety
 - Disruptions
 - ► ELMs
 - NTMs
 - Operational flexibility (for "discovery science")
 - "Advanced" tokamak operations, RWMs

Design Review References

- ★ Hawryluk. et al, "Principal physics developments evaluated in the ITER design review." Nucl. Fusion (2009) vol. 49 (065012) pp. 065012
- 2006: Call for issue cards. Establish DR Working Groups.
- Norbert Holtkamp, "The Design Review", July 11, 2007, Cadarache
- Gunther Janeschitz, "The Status of ITER: The ITER Design Review", Town Meeting, APS-DPP, October 2007
- Ted Strait, ITPA summary at 12th Workshop on MHD Control, Columbia University, Nov 18, 2007
- ★ Rich Hawryluk, "Principal physics developments evaluated in the ITER design review.", 22nd IAEA Conference on Fusion, 2008
- Hideyuki Takatsu, "Summery on ITER, ...", 23rd IAEA Conference on Fusion, 2010

Personal Observations

• Progress in fusion/tokamak research will produce new ideas and uncover new problems.

ITER must be flexible to changes/upgrades/exploration of new physics

• ITER will be have technical limitations due to first-of-a-kind novelty, unnoticed manufacturing shortcomings, and management decisions.

ITER must be flexible to changes/upgrades/exploration of new physics

• Discharge planning (with simulations and amazing modeling tools) will be need to fullyexploit ITER and achieve scientific and technical success.

ITER must be flexible to changes/upgrades/exploration of new physics