Lessons Learned from Eighteen Year Operation for the LHD Poloidal Coils Made from CIC Conductors

National Institute for Fusion Science

The experience gained from eighteen years of operation has provided further useful information

– Preventive design and maintenance

– Long-term changes in characteristics

Malfunction of Quench Detection System

- 9 malfunction events
- Noise from NBI
- Out-of-balance voltage due to coupling currents
- No malfunction since 2010 thanks to various measures

Helium Leak from Insulation Break

- Soap bubble testing
- Sudden helium leak during the 16th cool-down
- Replaced all breaks

Long-Term Changes in AC Loss

- Almost unchanged

Long-Term Changes in Hydraulic Characteristics

- Decreasing tendency

Steady Cooling 50,000 h
Excitation 10,000 h
Stable operation
No superconducting-to-normal transition