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## **ITR/P5-18: Transient Thermal-hydraulic Modeling and Analysis of Chinese HCSB TBM**

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The Chinese helium-cooled solid breeder (CH-HCSB) test blanket module (TBM) is designed to be tested in ITER, aiming to validate the feasibility of a DEMO fusion reactor with helium-cooled solid tritium breeders. Safety analysis is part of the TBM design process ensuring that the TBM does not adversely affect the safety of ITER. Transient thermal-hydraulic analysis was performed to testify that TBM and its helium cooling system will not impact the safety of ITER under both normal and accidental conditions. The latest design of TBM was introduced in the paper, and its transient thermal-hydraulic modeling and analysis were performed using RELAP5/MOD3 code. As the peak temperature of lithium pebble bed inside the sub-module is very high, detailed modeling of sub-module was proposed and verified. According to the accident sequences of Accident Analysis Specification for TBM, design basis accidents were investigated. The influences of different break locations, leak areas and plasma termination behavior were analyzed comprehensively. The results showed that the design of the CH-HCSB TBM could be further modified in order to assure the safety of the TBM to be tested in ITER.

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