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Analysis of Short Circuit Fault for 4.6GHz/6MW LHCD High Voltage Power Supply

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4.6GHz/6MW Lower Hybrid Current Drive (LHCD) is one of plasma current heating methods for Experimental Advanced Superconducting Tokamak (EAST). High Voltage Power Supply (HVPS) is the power supply subsystem of 4.6GHz/6MW LHCD system, which was designed, built and accepted successfully by Chinese National Development and Reform Commission in 2015. Then the new system has been in use for the 2015 EAST campaign. This paper presents the structure of 4.6GHz/6MW LHCD-HVPS and its transient operation state when its klystron load has short circuit fault. In order to protect the klystron and HVPS itself, the short-circuit fault and its transient process are analyzed and calculated in detail. And a three-electrode gas switch has been built to eliminate the short-circuit fault in microseconds. In addition, the effectiveness of the three-electrode gas switch has been verified by simulation and experiment result. The HVPS has been used in 4.6GHz/6MW LHCD system and it has good performance for the entire 2015 EAST campaign.

Eligible for student paper award?

Yes

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