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Stability of alpha particle-driven Alfvén eigenmodes in the Chinese Fusion Engineering Test Reactor GUOYONG FU, Zhejiang University, ZHEN-ZHEN REN, Dalian University of Technology, YANG CHEN, University of Colorado, ZHENG-XIONG WANG, Dalian University of Technology — The China Fusion Engineering Test Reactor (CFETR) is the next device in the Chinese roadmap for the realization of fusion energy, and is currently in design phase. In this work, the stability of alpha particle-driven Alfvén Eigenmodes (AEs) is investigated using a gyrokinetic ion/fluid electron hybrid code. It is found that the toroidal mode number of the most unstable mode is $n = 10$. The excitation threshold in central alpha particle beta is found to be about 0.2%, which is substantially below the expected value of alpha particle beta of 1% in CFETR. This result indicates that the high- n alpha particle-driven AEs are strongly unstable in CFETR, with many toroidal mode numbers simultaneously destabilized. Furthermore, a systematic study of parameter dependence has been carried out. It is found that the stability of AE with a single toroidal mode number is sensitive to the safety factor profile. However, the overall stability of AEs is much less sensitive to the q profile when different toroidal mode numbers are considered simultaneously. It is shown that the normalized alpha particle gyro-radius and the alpha particle speed are two important parameters determining the alpha particle drive. Detailed results will be presented.

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