EVOLUTION OF RESISTIVE INTERCHANGE AND TEARING MODES IN NEGATIVE CENTRAL SHEAR DISCHARGES IN THE DIII-D TOKAMAK

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Abstract. Tearing modes triggered by resistive interchange instabilities have been observed in the DIII-D tokamak discharges with strong negative central shear and L mode edge [R. Jayakumar et al., Phys. Plasmas **9**, 5043 (2002)]. The interchange-like mode is initially localized near the $q = 2$ surface and then grows in amplitude and expands radially. Once the instability reaches the vicinity of the axis, a reconnection occurs and an island is formed which later becomes localized near the $q = 2$ surface. The characteristics of the tearing mode appear to be consistent with double tearing. The displacements associated with the instabilities

have been calculated and it is seen that the appearance of the tearing mode is associated with a critical displacement amplitude of the interchange-like instability. Even in cases where the Resistive Interchange Mode itself is deemed to be not deleterious for the discharge, the subsequent island formation and tearing modes often affect the discharge significantly, if the interchange amplitude is above the critical value. The present observations shed light on the mechanism of reconnection and formation of islands, in this specific case of interchange-like instability leading to reconnection.

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