

# **Research on non-destructive examination of CICC cables based on the method of inversion of electromagnetic proper**

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The cable-in-conduit conductors (CICC) is a kind of preferred conductor for the large -scale superconducting magnets. It consists of jacket and thousands of superconducting cables. Superconducting cable is the core component of CICC conductor which carries tens of thousands of amps of current under extreme operating conditions. Once operated, they cannot be repaired and replaced for life. Its quality directly affects the performance of the conductor and even affects the safety of the superconducting Tokamak device. Due to the multi-level composite structure, it is easy to cause partial damage or even strand breakage of the superconducting cable in the complex deformation mode. The extreme operating conditions of low temperature, high current and strong magnetic field will further aggravate the damage of the strand, which affects the current carrying capacity of the cable. Therefore, it is vital to inspect superconducting cables on-line during the manufacture and operation process. This paper proposes a method based on magnetic field signal inversion. Through the combination of theoretical model and experimental research, the correlation between damage signal and magnetic flux leakage signal of superconducting cable is explored. Meanwhile, the wavelet transform is used to extract characteristics and reduce noise for strands signal, and then extract defect signal, which realizes the effectiveness of the new evaluation method in complex environment.