Contribution ID: **302** Contribution code: **TUE-PO1-615-03** Type: **Poster**

Research on Nondestructive Examination of Jacket Sections for CFETR TF Coil

Tuesday, 16 November 2021 13:15 (20 minutes)

The Chinese Fusion Engineering Testing Reactor (CFETR) is aiming to bridge the gap between the ITER and the first commercial fusion power plant, a necessary complement of the ITER. The requirement for sustaining long burn duration as specified in the duty time CFETR mission necessitates the use of superconducting magnets. Totally 16 TF D-shaped (six arcs and a straight leg) coils which are of cable-in-conduit conductor type are designed. All the subcomponets have very demanding requiremnt to withstand the severe enviroments. This paper give the the nondestructive test (NDT) method developed for th (TF) coil conductor jackets made of 316L stainless steel.Based on the linear elastic fracture mechanics, maximum acceptable defect sizes in the TF jacket material have been defined. PAUT method and ECT method were devloped for the circular-in-square jacket inspection . For PAUT method , foculs laws are calucated and optimized. for ECT method, specific ECT probe was designed and manufatured. Benchmark experiments were carried out to study the NDT reliability.

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Session Classification: TUE-PO1-615 Structural Materials for Magnets