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**Analysis of Mechanical Stresses/Strains in Superconducting Wire**[1] MATTHEW BARRY, Auburn University, JINGPING CHEN, YUHU ZHAI, Princeton Plasma Phys Lab — The optimization of superconducting magnet performance and development of high-field superconducting magnets will greatly impact the next generation of fusion devices. A successful magnet development, however, relies deeply on the understanding of superconducting materials. Among the numerous factors that impact a superconductors performance, mechanical stress is the most important because of the extreme operation temperature and large electromagnetic forces. In this study, mechanical theory is used to calculate the stresses/strains in typical superconducting strands, which consist of a stabilizer, a barrier, a matrix and superconducting filaments. Both thermal loads and mechanical loads are included in the analysis to simulate operation conditions. Because this model simulates the typical architecture of major superconducting materials, such as $Nb_3Sn$, $MgB_2$, Bi-2212 etc., it provides a good overall picture for us to understand the behavior of these superconductors in terms of thermal and mechanical loads.

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Matthew Barry
Auburn University

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