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## Analysis of Radial Preload of 14 T MRI Magnet

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To study and explore the key technology of Ultra-high field MRI system, the 14 T body-size MRI magnet technology study activities has be launched by the Institute of Plasma Physics Chinese Academy of Sciences (ASIPP). The Nb<sub>3</sub>Sn Rutherford-type cables is designed for the conductor structure due to the 14 T magnet. The preload must be applied for the coil at room temperature, to counteract the Lorentz forces during operation condition. However, the Nb<sub>3</sub>Sn superconductor is sensitive to the strain and maybe leads to an irreversible degradation. Therefore, it is necessary to design the reasonable preload structure and evaluate the performance of the structure. Firstly, a 2-angle model of main magnet is established. By simulating the preload, it is obtained that the stress and strain on the conductor will decrease with the increase of preload. Then the 1/4 model of the whole main magnet, with the pre-tightening plate arranged on the axial direction, is established. By optimizing the pre-tightening force in the bolt, the stress and strain of the conductor will be kept in a reasonable range. Finally, the requirements and feasibility of the preloading structure are discussed.

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