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## FCC-hh Nb<sub>3</sub>Sn wire development: exploring the microstructure of prototype samples.

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A key requirement for the realization of the FCC is the development of high-field superconducting dipole magnets: considering that Nb<sub>3</sub>Sn is currently the best candidate material (with the related requirements of non-Cu  $J_c = 1.5 \text{ kA/mm}^2$  at 16 T and 4.2 K), the microstructural analysis of prototype internal tin Nb<sub>3</sub>Sn wires, manufactured by the Bochvar Institute with different designs and heat treatments, will be presented. The chemical composition and microstructure investigation is an important contribution to better understand which directions should be followed in the manufacturing process for producing wires with higher performance. In this study, the homogeneity of elemental concentrations all over the cross section will be discussed and compared for different wires, with a main focus on the Sn distribution. For this purpose, energy dispersive X-ray (EDX) spectroscopy was employed with both scanning electron microscopy (SEM) and transmission electron microscopy (TEM), performing EDX line scans along the radial and tangential directions in wire sub-elements. It will be shown how the elemental distributions are influenced by the wires different characteristics such as sub-element geometries, grain sizes and grain orientations.

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