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[Invited] Stability of Nb₃Sn Superconducting Planar Undulator for ANL Advanced Photon Source

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A project aiming to fabricate an operational Nb₃Sn superconducting undulator for the storage ring of the Advanced Photon Source at Argonne National Laboratory is under way. The Nb₃Sn undulator has a design magnetic field of 1.2 T and a nominal operation current of 850 A. The maximum magnetic field on the conductor is about 5 T. With large critical current densities, the 35 μm subelement size of the 0.6 mm Restacked Rod Processed wires with 144 superconducting subelements over 169 total is at the very limit of magnetic stability. The heat treatment has therefore been studied and optimized to obtain parameters within operation specifications. In this paper we show performance results on wires and coils from different heat treatments.

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