

**A 2-GeV, 1-MW Pulsed Proton Source for a Spallation Source**\*, Y.-C. CHAE, Y. CHO, E. CROSBIE, H. FRIEDSAM, K. HARKAY, D. HORAN, R. KUSTOM, E. LESSNER, W. MCDOWELL, D. MCGHEE, H. MOE, R. NIELSEN, G. NOREK, K. PETERSON, K. THOMPSON, M. WHITE, ANL - A design study of a 1-MW pulsed proton source based on a 2-GeV rapid cycling synchrotron (RCS) has been completed. The RCS operates at a 30 Hz repetition rate. A 400-MeV  $H^-$  injector linac allows transverse phase space painting during injection. The linac beam is chopped near the ion source so that the phase space of the incoming beam fits into the waiting synchrotron bucket. Chopping in this way minimizes potential beam loss during the rf capture process. An rf system provides a peak voltage of about 180 kV with a frequency swing of 1.1 to 1.5 MHz. The rf voltage programming was developed using particle tracking that included space charge effects, in order to eliminate possible beam losses. The design takes into account re-use of existing buildings and infra-structure of the former 12-GeV Zero Gradient Synchrotron.

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