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Transients on Arc and Converter currents in the Multicusp Cesium Surface Conversion H⁻ Source at LANSCE

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The Multicusp Cesium Surface Conversion H⁻ Ion Source at the Los Alamos Neutron Science Center (LANSCE) has provided beam at ~14 mA, 120 Hz, and 10% D.F. for many years of neutron science research. Recently, random high current transients were discovered in the arc current used to ionize hydrogen in the LANSCE H⁻ ion source, and in the converter current used to convert protons to H⁻ ions. Most have no effect, but more severe transients can cripple beam output. Hypothesized causes are related to cesiation effects, plasma potential changes, tungsten filament evaporation/sputtering, or from the arc modulator circuitry. A dedicated study was recently done on the LANSCE H⁻ Ion source test stand to determine the cause of these transients. Current understanding indicates that the more severe transients come from a combination of cesiation effects and plasma potential changes. The status of these current transient studies on the LANSCE H⁻ ion source will be discussed.

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