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Overview of atomic tritium efforts within Project 8[1] LUCIE TVRZNIKOVA, Lawrence Livermore National Laboratory, PROJECT 8 COLLABORATION — Neutrino flavor oscillation experiments prove that neutrinos have nonzero masses, but cannot determine the absolute mass scale. To address this question, the effective mass of the electron antineutrino $m_{\overline{\nu}_e}$ can be determined from a sufficiently high-precision measurement of the tritium beta-decay spectrum around its endpoint (Q = 18.6 keV). Project 8 is a next-generation experiment using the novel Cyclotron Radiation Emission Spectroscopy (CRES) technique to perform a radio-frequency-based measurement of the decay electron energy. To achieve its design sensitivity of $m_{\overline{\nu}_e} \sim 40$ meV, Project 8 will use an atomic tritium source to eliminate rotational and vibrational excitations of molecular tritium that perturb the tritium spectrum endpoint. The collaboration is developing techniques needed to produce, cool, and trap atomic tritium compatible with CRES. These efforts include testbeds to characterize the efficiency of production, formation, magnetic focusing, and cooling of a hydrogen, deuterium, and later tritium beam for injection into an atomic trap. I will present the latest progress toward atomic tritium within the collaboration.

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