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Setting Limits on the Local Density of the Cosmic Neutrino Background Using KATRIN ASHER KABOTH, Massachusetts Institute of Technology, KATRIN COLLABORATION — The relic neutrinos of the cosmic neutrino background are nearly as numerous as the photons in the cosmic microwave background. However, due to their low energy—predicted to be 1.9K in the Standard Model—they are very difficult to detect directly. One process, neutrino capture on tritium ($\nu_e + \text{T} \rightarrow {}^3\text{He} + e^-$), presents a threshold-free way to detect such low energy neutrinos. Such a process would show up as a spike in the tritium beta decay spectrum at $1 \times m_{\nu_e}$ above the beta decay endpoint. The KATRIN experiment, which uses tritium beta decay to measure the electron neutrino mass, has potential sensitivity to this neutrino capture process if the local density or the cross section is significantly greater than expected. This talk describes KATRIN's sensitivity to this process and its implications for the cosmic neutrino background.

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