

Solar neutrino flux at keV energies

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We calculate the solar neutrino and antineutrino flux in the keV energy range. The dominant thermal source processes are photo production ($\gamma e \rightarrow e \nu \bar{\nu}$), bremsstrahlung ($e + Ze \rightarrow Ze + e + \nu \bar{\nu}$), plasmon decay ($\gamma \rightarrow \nu \bar{\nu}$), and pair emission in free-bound and bound-bound transitions of partially ionized elements heavier than hydrogen and helium. To calculate the latter we use libraries of monochromatic photon radiative opacities in analogy to a previous calculation of solar axion emission. Our overall flux and many details differ significantly from previous works. While this low-energy flux is not measurable with present-day technology, it could become a significant background for future direct searches for keV-mass sterile neutrino dark matter.

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