

## 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 photoproduction ( $\gamma e \rightarrow e\nu\bar{\nu}$ ), bremsstrahlung ( $e + Ze \rightarrow Ze + e + \nu\bar{\nu}$ ), plasmon decay ( $\gamma \rightarrow \nu\bar{\nu}$ ), and  $\nu\bar{\nu}$  emission in free-bound and bound-bound transitions of partially ionized elements heavier than hydrogen and helium. These latter processes dominate in the energy range of a few keV and thus carry information about the solar metallicity. To calculate their rate we use libraries of monochromatic photon radiative opacities in analogy to a previous calculation of solar axion emission. Our overall flux spectrum 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.

**Primary author:** Mr VITAGLIANO, Edoardo (Max Planck Institute for Physics)

**Co-authors:** Prof. RAFFELT, Georg (Max Planck Institute for Physics); Dr REDONDO, Javier (Department of Theoretical Physics, University of Zaragoza)

**Presenter:** Mr VITAGLIANO, Edoardo (Max Planck Institute for Physics)

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