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Joint constraints on neutrino mass and number of effective neutrino species from cosmology

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We present joint constraints on the number of effective neutrino species Neff and the sum of neutrino masses, using a technique based on state-of-the-art hydrodynamical simulations with massive neutrinos, which allows one to exploit the full information contained in the one-dimensional Lyman-Alpha forest flux power spectrum complemented by additional cosmological probes. Our results provide strong evidence for the cosmic neutrino background (Neff = 0 is rejected at more than 14σ), and rule out the possibility of a sterile neutrino thermalized with active neutrinos at a significance of over 5σ – one of the strongest bounds to date.

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