RESEARCH TRAINING GROUP
Models of Gravity

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## How to relax the cosmological neutrino mass bound

### Abstract

The talk deals with the impact of non-standard momentum distributions of cosmic neutrinos on the anisotropy spectrum of the cosmic microwave background and the matter power spectrum of the large scale structure. The neutrino distribution has almost no unique observable imprint, as it is almost entirely degenerate with the effective number of neutrino flavours, $N_{eff}$, and the neutrino mass, $m_\nu$. Performing a Markov chain Monte Carlo analysis with current cosmological data, it has been demonstrated that the neutrino mass bound heavily depends on the assumed momentum distribution of relic neutrinos. The message of this work is simple: cosmology allows that neutrinos have larger masses if their average momentum is larger than that of a perfectly thermal distribution. An example in which the mass limits are relaxed even by a factor of two is provided.