iPoster Session 177 — Cosmology

177.01 — Examining Sterile Neutrino Dark Matter Production Models

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Recent X-ray observations of galaxies and galaxy clusters may be evidence of sterile neutrino dark matter with a mass of 7.1 keV. However, the simplest production mechanism for this dark matter candidate produces dark matter spectra that are in tension with observed large scale structure. In this poster, we examine a variety of sterile neutrino dark matter models, including a variety of active-sterile neutrino coupling schemes and mixed dark matter models, comprised of both sterile neutrinos and cold dark matter. We assess the compatibility of these models with observation by calculating cosmological observables resulting from these production mechanisms.

177.02 — Massive sterile neutrinos in the early universe: entropy and relativistic energy production, nucleosynthesis and the relic neutrino background

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The hot and dense early universe combined with the promise of high-precision cosmological observations provide an intriguing laboratory for Beyond Standard Model physics. We simulate the early universe around the time of weak decoupling to explore the effects of the existence of massive sterile neutrino states and their decay into Standard Model particles on the Cosmic Neutrino Background and Big Bang Nucleosynthesis (BBN). These particle decays create a population of high-energy out-of-equilibrium active neutrinos that can be constrained by their inferred value of N_{eff} , the effective number of relativistic degrees of freedom. This work looks to identify sterile neutrino properties that are consistent with N_{eff} observations and to discuss the implications of the high-energy neutrino population on BBN yields and the relic neutrino background.

177.03 — The Escape of Ly-alpha and Ly-continuum Radiation from Low- and Intermediate-Mass Galaxies

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We present our results on calculations of the escape of Ly-alpha and Ly-continuum radiation from low- and intermediate-mass galaxies. Such systems may have played a crucial role in reionization at early times. We use simple analytic models for the underlying galaxy profiles and compare them with semi-analytic and numerical computations of escaping radiation from such systems. We comment on the possible range of values for the critical spectral index of the source radiation at which H and He ionization start to compete, under a variety of physical conditions. Last, we examine data of low- and intermediate-mass galaxy populations in the local volume, including strong-emission line systems like green pea galaxies and Ly-alpha emitting systems, that closely resemble the earliest halos that hosted the first stars. We share a set of observable galaxy properties that could characterize the "leakers", whose high-redshift counterparts would have had significant escape of Ly-alpha and Ly-continuum radiation. This work was supported by the University of San Francisco (USF) Faculty Development Fund, the USF Student Travel Fund, and by the Undergraduate ALFALFA Team through NSF grant AST-1637339.

177.04 — The Cosmology Large Angular Scale Surveyor

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The Cosmology Large Angular Scale Surveyor (CLASS) is a telescope array to probe reionization and inflation through their signatures in the cosmic microwave background polarization. CLASS is unique in its design to target the polarization signal on the largest angular scales (greater than ten degrees) that is traditionally only measured by space-based platforms. CLASS has been operating for three years high in the Andes of northern Chile. In this poster I will give an update on the instrumentation, the survey, and early results.