325.06 — More than Star Formation: The High-J CO SLEDs of High-z Galaxies

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Theoretical work suggests that AGN play an important role in quenching star formation in massive galaxies. In addition to molecular outflows observed in the local universe, emission from very high-J CO rotational transitions have been a key piece of evidence for AGN directly affecting the molecular gas reservoirs that fuel star formation. However, very few observations exist of CO rotational lines past the peak of the CO spectral line energy distribution for galaxies in the early universe. Here we will present new ALMA observations of high-J CO rotational lines (CO(10-9) through CO(16-15)) in five z > 2 IR-bright AGN host galaxies. We will discuss the excitation mechanisms for these lines, the fraction of these galaxies' molecular gas impacted by the AGN, and how that might affect their star formation.

325.07 — Optical study of PKS B1322-110, the intra-hour variable radio source

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Observations with the Australia Telescope Compact Array revealed intra-hour variations in the radio source PKS B1322-110 (Bignall et al 2019). To determine whether scintillation by intervening plasma in our galaxy is responsible for the rapid radio variability, we obtained Gemini Halpha and Halpha continuum images of the PKS B1322-110 field. A clear flux excess detected in the Halpha image prompted us to obtain the first optical spectrum of PKS B1322-110. With the Gemini spectrum we determine that PKS B1322-110 is a quasar at a redshift of z = 3.007 ± 0.002. The apparent flux detected in the Halpha filter is likely to originate from He II emission redshifted precisely into the Halpha bandpass.

Oral Session 326 — Supernovae II

326.01 — The First Supernovae — Puzzles and Constraints

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Observational constraints on the element abundances in metal-poor stars in the Galactic halo have grown dramatically over the past decade. Such data is now available for a few up to dozens of elements in the Milky Way as well as extragalactic halos. Despite this greatly increased observational database and important strides in the theoretical understanding of the first stars, interpreting the signature of primordial supernovae remains challenging. This signature may manifest through element abundance patterns in Galactic hyper-iron-poor stars or ultra-metal-poor stars, or in local dSph galaxies. These patterns can be tied through modeling (with some caveats) to the nucleosynthetic output of individual supernovae from first-generation stars. We share ongoing calculations of the current constraints on the first supernovae and some fascinating puzzles that remain unresolved to date. A first-stars supernova model needs to explain the widely-noted enhancement of carbon and many alpha-elements at the lowest [Fe/H], but also must consistently account for the trends in N, Li, Ca and Ti in the broader framework of the structure, rotation and binarity of early stellar generations. Last, we note that Ti may not always behave like an alpha-element, especially below [Fe/H] of about -3, providing an additional constraint on the first supernovae. This work was supported by the University of San Francisco (USF) Faculty Development Fund, and by the Undergraduate ALFALFA Team through NSF grant AST-1637339.

326.02 — Supernova Remnant Progenitor Masses in M83

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With resolved stellar photometry from Hubble Space Telescope WFC3/UVIS imaging of M83, we fit for the ages of the young, resolved stellar populations at the locations of optically-identified supernova remnants (SNRs) in M83. We generate color-magnitude diagrams of the stars within 50 pc of each SNR and fit stellar evolution models to obtain the population ages. From each of these ages, we infer the progenitor mass that corresponds to the lifetime of the most