



Universiteit  
Leiden  
The Netherlands

## The galaxies associated with the bimodal metallicity distribution

Berg, M.A.; Howk, J.; Lehner, N.; O'Meara, J.; Straka, L.

### Citation

Berg, M. A., Howk, J., Lehner, N., O'Meara, J., & Straka, L. (2020). The galaxies associated with the bimodal metallicity distribution. *American Astronomical Society Meeting Abstracts* \#235, 708-708. Retrieved from <https://hdl.handle.net/1887/3655541>

Version: Publisher's Version  
License: [Creative Commons CC BY 4.0 license](https://creativecommons.org/licenses/by/4.0/)  
Downloaded from: <https://hdl.handle.net/1887/3655541>

**Note:** To cite this publication please use the final published version (if applicable).

## Oral Session 414 — Mapping the Multiphase Medium, Beyond Galaxies

### 414.01 — The Galaxies Associated with the Bimodal Metallicity Distribution

M. A. Berg<sup>1</sup>; J. Howk<sup>1</sup>; N. Lehner<sup>1</sup>; J. O’Meara<sup>2</sup>; L. Straka<sup>3</sup>

<sup>1</sup> Physics, University of Notre Dame, Notre Dame, IN

<sup>2</sup> W. M. Keck Observatory, Kamuela, HI

<sup>3</sup> Leiden University, Leiden, Netherlands

We present the first results of the bimodal absorption system imaging campaign (BASIC) program in which we identify the host galaxies for half of the Lehner et al. 2013 sample of Lyman limit systems ( $16 \leq \log N_{\text{HI}} \leq 19$  [cm<sup>-2</sup>]) using VLT/MUSE and Keck/KCWI integral field unit data. This sample of HI absorbers at  $z < 1$  shows a striking bimodality in metallicity with branches centered on  $\sim 2\%$  and  $40\%$  solar metallicity. This result hints at the possibility that these branches are tracing cold-mode accretion and gas participating in outflows, recycling, and hot-mode accretion. We identify absorber host galaxies through spectroscopy and covering factor estimates and characterize the host masses, SFRs, metallicities, and inclinations among other properties. With the galaxy information we can test our theory about the types of galaxies we expect to house these metal-rich and metal-poor HI absorbers.

### 414.02 — Emission Observations of Circumgalactic Gas

C. Martin<sup>1</sup>

<sup>1</sup> California Institute of Technology, Pasadena, CA

I describe observations with the Palomar Cosmic Web Imager and the newly commissioned Keck Cosmic Web Imager of the Circum-Galactic Medium (CGM). We show ubiquitous Lyman alpha emission near  $2 < z < 3$  QSOs, a significant number of systems velocity shear and angular momentum, filamentary and disklike morphology, and features expected from cold flow inspiral structures. In particular, new observations with KCWI show unambiguously both rotation and radial inflow in filamentary patterns, strong evidence for a cold-flow origin of high- $z$  star-forming galaxies and for the deliverance of angular momentum via filamentary inflow in forming galaxies. We have also detected HeII and searched for CIV in several systems, allowing further constraints on the ionization, temperature, and

metallicity of the gas. We also provide a brief report on the first flight of FIREBALL-2 to explore the low redshift CGM.

### 414.03 — The DEUCE payload: Sounding Rocket EUV Observations of Local B Stars to Determine Their Potential for Supplying Intergalactic Ionizing Radiation

N. Erickson<sup>1</sup>; J. Green<sup>2</sup>; K. France<sup>2</sup>; J. Stocke<sup>2</sup>; B. Fleming<sup>2</sup>

<sup>1</sup> APS, University of Colorado, Boulder, Boulder, CO

<sup>2</sup> University of Colorado, Boulder, CO

The Dual-Channel Extreme Ultraviolet Continuum Experiment (DEUCE) is a sounding rocket-borne spectrograph operating in the 700-1150Å range at medium resolution. DEUCE is designed to observe the nearby B stars Epsilon and Beta CMa, providing the first direct measurement of the flux of hot stars across the 912Å Lyman break. No such calibrated observations exist, meaning DEUCE will serve as a unique test of current stellar models in this critically ionizing bandpass. The primary goal of DEUCE is to help clarify the contribution of B stars to ionization balance in the modern universe, potentially contributing to our understanding of issues like the Photon Underproduction Crisis. In this talk I present the science motivation, instrument design, and build-up of the DEUCE payload, as well as flight data and science results from DEUCE’s December 2018 launch. Key results include the first ever spectrum of a hot, early-type star from 730-912Å, as well as a better characterization of the Epsilon CMa sightline, one of the most sparse stellar sightlines currently known in the Interstellar Medium.

### 414.04 — Understanding Galaxy Evolution with Far-Infrared and Millimeter Datasets

K. R. Hall<sup>1</sup>

<sup>1</sup> Physics and Astronomy, Johns Hopkins University, Baltimore, MD

In this talk, I will present my dissertation work on understanding galaxy evolution via far-infrared and millimeter observations of quasars and their environments. Accreting supermassive black holes impact the evolution of massive galaxies via quasar-driven winds and other forms of feedback. One firm prediction of quasar feedback models is a hot bubble of post-shock gas, which can be observed via the thermal Sunyaev-Zel’dovich (tSZ) effect in the millimeter regime of quasar spectral energy distributions (SEDs). I will show the average SEDs of 109,829