the Mach number (the ratio of wind speed to sound speed). Transonic flow does not generally occur on Earth, where even including the jets, the engineer's rule of thumb for ignoring compressibility effects on pressure and density, Ma < 0.3, is satisfied. In stark contrast, we find on Mars that only about 15% of its atmosphere's horizontal area satisfies Ma < 0.3, meaning that compressibility effects cannot be neglected, even away from the wintertime jets. Strong compressibility effects are a common trait of tenuous atmospheres, but the implications of 0.3 < Ma have not yet been incorporated into the design of those atmospheric models for Mars that have been adapted from Earth models, which represents the majority in use today. We are also analyzing the seasonal variations of the Froude number, Fr, which is the analogue for buoyancy waves ("gravity waves") of the Mach number. During northern winter (Ls ~ 270°), Fr reaches a maximum in the northern polar jet, with the strong likelihood of supercritical-to-subcritical transitions that signify a planetary-scale hydraulic jump. We will report our latest results characterizing the seasonal behavior of the wintertime jets on Mars in terms of the global Ma and Fr fields.

278.06 — New Insights into the Eris/Dysnomia System

B. Holler[1]; W. Grundy[2]; K. Murray[1]; L. Young[3]; S. Porter[3]; M. Buie[3]; K. Noll[4]; M. Mommert[2]

[1] *Space Telescope Science Institute, Baltimore, MD*

[2] *Lowell Observatory, Flagstaff, AZ*

[3] *Southwest Research Institute, Boulder, CO*

[4] *Goddard Space Flight Center, Greenbelt, MD*

The dwarf planet (136199) Eris is known to be the most massive Kuiper Belt Object (KBO) based on the orbit of its large satellite, Dysnomia. At first glance, this system appears to be similar to the Pluto/Charon binary, but there is still much to learn about Eris and Dysnomia. In order to further characterize this system, we used the WFC3 camera onboard the Hubble Space Telescope in early 2018 to observe Dysnomia at roughly evenly spaced intervals over one full orbit. From these data we (1) computed a new orbital fit for Dysnomia, (2) determined the current pole orientation of Eris and characterized its seasons in the present epoch, (3) evaluated the maximum albedo variations across Eris' surface, (4) constructed a rotational light curve of Dysnomia for comparison to ground-based Palomar P60 data of Eris to determine the tidal state of the system, (5) searched for minor satellites, and (6) constrained the Dysnomia-to-Eris mass ratio. Future work will explore the seasonal cycle of Eris over Myr timescales.

Poster Session 279 — Large Scale Structure, Cosmic Distance Scale

279.01 — A Local Baryonic Tully-Fisher Relation from IllustrisTNG

J. T. Borden[1]; M. G. Jones[2]; M. P. Haynes[1]

[1] *Cornell University, Ithaca, NY*

[2] *Instituto de Astrofísca de Andalucía, Granada, Spain*

The Pisces-Perseus Supercluster (PPS) offers a convenient, accessible environment for the study of large scale structure in the local universe. The Arecibo Pisces-Perseus Supercluster Survey (APPSS) seeks to observe the infall of galaxies toward the main filament of the PPS which is nearly perpendicular to our line of sight. Tracing such infall reveals valuable information about the gravitational field - and thus mass distribution - of the PPS. However, obtaining accurate measurements of such deviation from smooth Hubble flow requires redshift-independent distance measurements. The baryonic Tully-Fisher relation (BTFR) offers an appealing solution in the distance regime of the PPS, but while the high-mass end of this relation boasts a tight correlation, the low-mass end - where the APPSS sample lies - shows considerably more scatter. We use the magnetohydrodynamical simulations of IllustrisTNG to examine a template BTFR in an attempt to better understand the error budget of, and identify systematic scatter within, the BTFR as it corresponds to the APPSS sample of galaxies. We find the low mass scatter of the simulated BTFR to be populated predominantly by highly gas dominated, low surface brightness galaxies with colors less blue than typical. This unusually quiescent subset of galaxies appears to share systematically inefficient star formation, with very high gas depletion timescales that deviate rapidly from an otherwise gradual trend apparent throughout the rest of the galaxy population. This subset of inefficiently star forming galaxies tends to decrease the slope of the BTFR at low masses, an effect that lies in contrast to the steepening of the BTFR generally expected in this mass regime. Further work is needed to determine if this collection of galaxies is physically motivated or is instead a finite resolution effect of the simulation. This work is supported by NSF/AST-1714828 to MPH.