Manx comets — a class of newly discovered long period comets lacking a tail — likely represent material formed in the inner solar system during planet formation. One such potential comet, C/2017 O1 was discovered by the ASAS-SN survey when it outburst at 1.92 au, brightening by 5 magnitudes. Through follow up photometry and measured production rates for water and CO2, we have been able to constrain the nucleus to 920m, and determine the rate of change in the necessary sublimating surface area. Both the brightness and rate of water sublimation took an unusually long time to return to normal after the outburst, indicating that the outburst must have ejected large icy grains ~1 m in radius that took on the order of 6 months to disappear. The excess of CO/CO2 measured during the outburst, along with the large ejected grains indicate that sub-surface volatile sublimation or amorphous ice transitions are responsible for the outburst. Understanding the outburst of Manx comets will allow us to determine the composition and dynamics of these unique bodies.

454.03 — A Bayesian Posterior for Intelligent Life

D. Kipping[1]
[1] *Astronomy, Columbia University, New York, NY*

Life emerged on the Earth within the first octile of its habitable window. A technological civilization only emerged in its final octile. What do these two facts tell us - if anything - about the probability for these events to occur? Specifically, we consider running Earth's clock back and treating these events probabilistically. Using a Bayesian formalism, we show that abiogenesis is sensitive to the priors assumed, in agreement with previous work. However, the emergence of intelligence is robust against prior choices and we are able to state confidently that it takes at least a billion years to evolve. This makes stars of earlier type than the Sun unlikely seats for emergent technological civilizations and thus should not be prioritized for future SETI work.

iPoster Session 455 — Galaxies

455.01 — Globular clusters in the Dwarf Spiral Galaxy NGC 2403

J. Day[1]*; A. J. Romanowsky*[1]*; S. S. Larsen*[2]*; J. P. Brodie*[3]*; A. Wasserman*[3]*; The MADCASH Collaboration*[1]
[1] *San José State University, San Jose, CA*
[2] *Radboud University, Nijmegen, Netherlands*
[3] *University of California, Santa Cruz, Santa Cruz, CA*

We examine observational data from the nearby dwarf spiral galaxy NGC 2403 in order to locate and characterize its globular star clusters (GCs), in connection with understanding the assembly of its stellar halo. The GC system of this galaxy was last studied 35 years ago, and here we compile and analyze new imaging data from the Sloan Digital Sky Survey, the Hubble Space Telescope, and Subaru/Hyper Suprime-Cam. We also report results from new follow-up spectroscopy with the Keck Observatory.

455.02 — Discovery of aLocal Volume Galaxy in the Zone of Avoidance using HI Surveys

E. Tollerud[1]*; D. DeFelippis*[2]*; M. Putman*[2]
[1] *Space Telescope Science Institute, Baltimore, MD*
[2] *Columbia University, New York, NY*

We report on the confirmation of a detection from the GALFA-HI 21 cm survey of a Local Volume dwarf galaxy near the plane of the Milky Way. The galaxy has been confirmed via broad-band optical and Halpha follow-up of candidates from GALFA-HI. Those provides a valuable proof-of-concept both for ways to fill out areas of the sky inaccessible via standard optical techniques, as well as providing a pathfinder for potential future large HI surveys.

455.03 — Morphologies, Star-forming Regions, and Star Cluster Populations of Gas-Rich Ultra-Diffuse Galaxies

A. Cajucom[1]*; E. Cabrera*[1]*; A. J. Romanowsky*[1]*; The ALFALFA HUDs Team*[1]
[1] *Physics & Astronomy, San Jose State University, San Jose, CA*

Ultra-diffuse galaxies (UDGs) were identified as a population with large sizes and low surface brightness in high-density environments. Galaxies with similar characteristics in low density environments were found through their HI emission in the ALFALFA survey, after matching with optical imaging from the Sloan Digital Sky Survey. Here we carry out a follow-up optical study of these gas-rich UDGs, using deeper and higher-resolution archival imaging from the *Hubble Space Telescope* and CFHT/MegaCam. These high-quality data enable us to characterize the gas-rich UDG morphologies, star-forming regions, and star cluster populations.

455.04 — The Many Faces of Shocked and Turbulent Gas in Nearby Extragalactic Systems

P. Appleton[1]*; B. Emonts*[2]*; D. Fadda*[3]*; P. Guillard*[4]*; P. Ogle*[5]*; L. Lanz*[6]*; C. Mundell*[7]*; U. Lisenfeld*[8]*; E. Falgarone*[9]*; J. Braine*[10]