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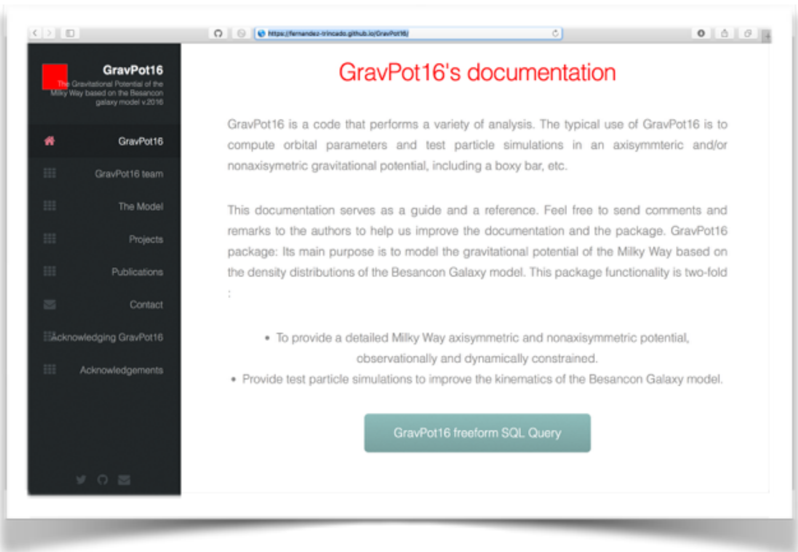
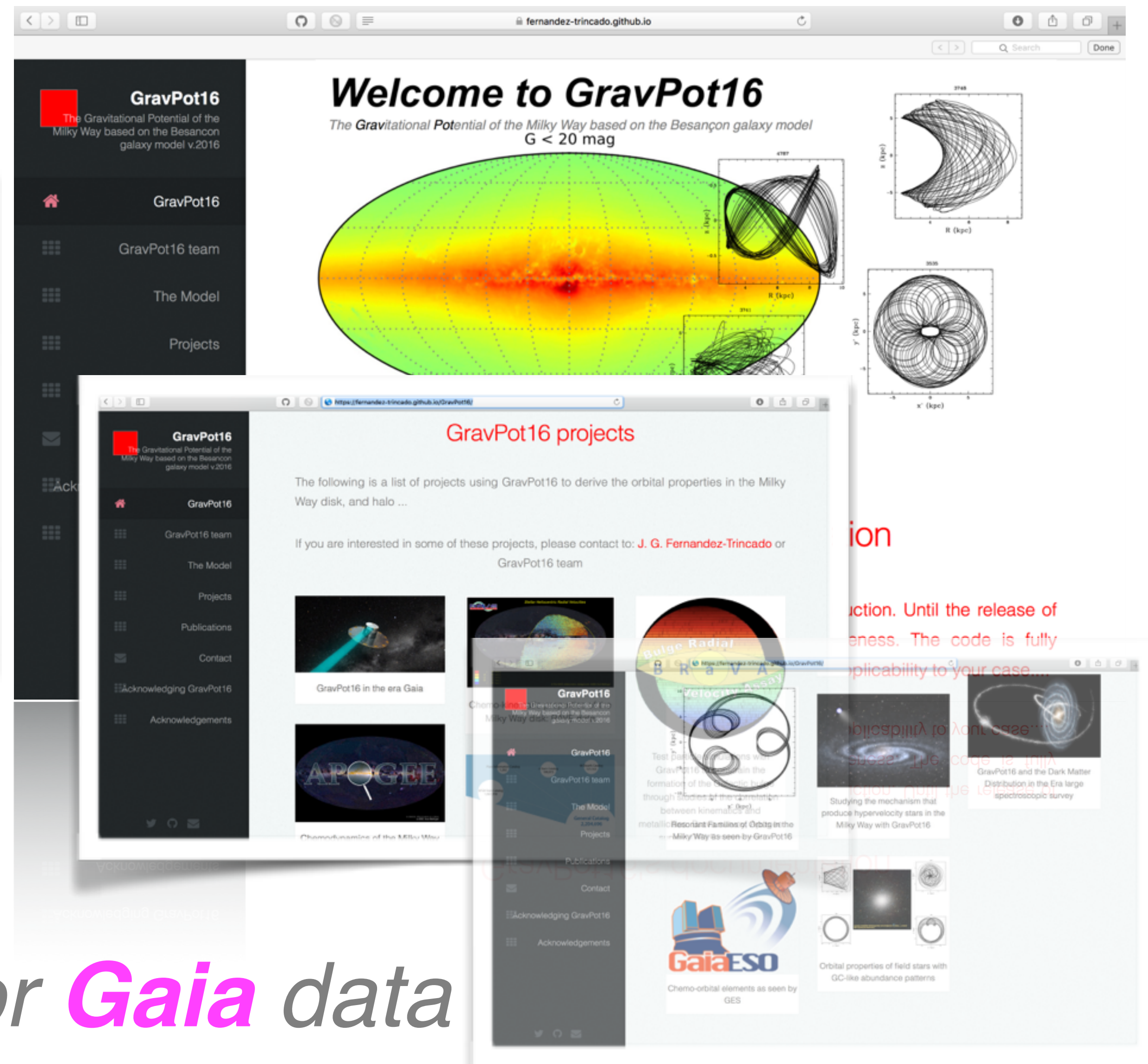
EWASS2016
Athens, Greece
4 - 8 July

https://fernandez-trincado.github.io/GravPot16/

In Construction





GravPot16 is an interactive tool to allow people to access ***Orbit computations****,* ***test particles*** *simulations easily online*

An analysis tool for ***Gaia*** *data*

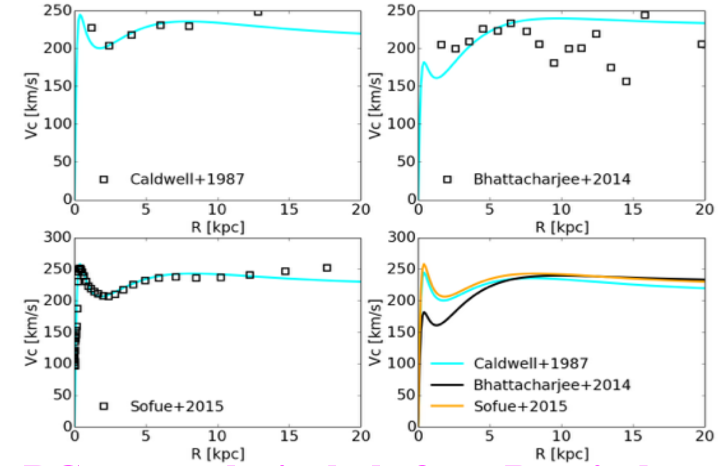
The Model

Table 1. Density laws and associated parameter of the stellar components. $a_+^2 = R^2 + \frac{z^2}{\epsilon^2}$ and $a_-^2 = R^2 + \frac{z^2}{(R_+^2/R_-^2)\times\epsilon^2}$ where R is the galactocentric distance, z is the height above the Galactic plane, and ϵ is the axis ratio. Values of ϵ are given in table 2. The disk density law is given here without the warp and flare. d_0 are normalization constants.

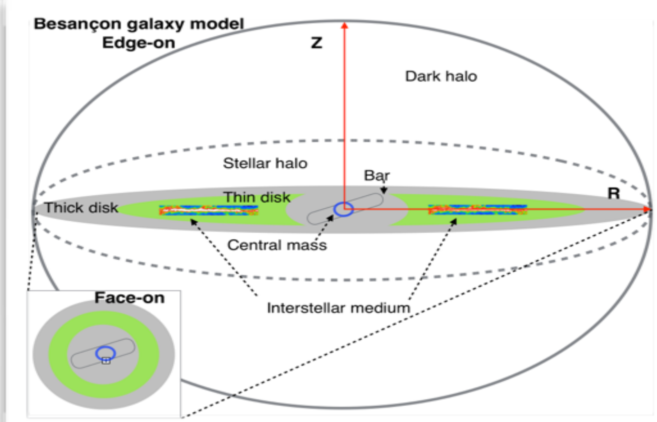
	density law		References
The youngest thin disk	$\rho_\odot/d_o \times \{\exp(-a_+^2/h_{R_+}^2) - \exp(-a_-^2/h_{R_-}^2)\}$ with $h_{R_+} = 5000$ pc, $h_{R_-} = 3000$ pc	if age ≤ 0.15 Gyr	(Robin et al. 200
The old thin disk	$\rho_\odot/d_o \times \{\exp(\chi - (\chi^2 + a_+^2/h_{R_+}^2)^{1/2}) - \exp(\chi - (\chi^2 + a_-^2/h_{R_-}^2)^{1/2})\}$ with $\chi = 0.5$, $h_{R_+} = 2170$ pc, $h_{R_-} = 1330$ pc	if age > 0.15 Gyr	(Robin et al. 200
Thick disk	$\rho_\odot/d_o \times \exp(-\frac{R-R_\odot}{h_R}) \times (1 - \frac{1/h_z}{x_l \times (2.+x_l/h_z)} \times z^2)$	if $\lvert z\rvert \leq x_l$, x_l=xxx pc	(Robin et al. 200
	$\rho_\odot/d_o \times \exp(-\frac{R-R_\odot}{h_R}) \times \frac{\exp(x_l/h_z)}{1+x_l/2h_z} \exp(-\frac{\lvert z\rvert}{h_z})$ with $h_R = 2500$ pc, $h_z = 800$ pc	if $\lvert z\rvert > x_l$	
Stellar halo	$\rho_\odot\left(\frac{R}{R_{core}}\right)^{-\gamma}\left[1+\left(\frac{R}{R_{core}}\right)^{\alpha}\right]^{(\gamma-\beta)/\alpha}$ $R^2 = X^2 + Y^2 + (Z/q)^2$ with $R_{core} = 2.6$ kpc, $\alpha =$, $\beta =$, $\gamma =$ and $q = 0.7$		(Robin et al. 201
Bar	$\rho_c \times sech^2(R_{bar})$ $R_{bar}^{C_\parallel} = \left\{\left\lvert\frac{X}{X_o}\right\rvert^{C_{perp}} + \left\lvert\frac{Y}{Y_o}\right\rvert^{C_{perp}}\right\}^{C_\parallel/C_{perp}} + \left\lvert\frac{Z}{Z_o}\right\rvert^{C_\parallel}$ with $C_\parallel =$ and $C_{perp} =$		(Robin et al. 2012)
ISM	$\rho_0 \times exp(-\frac{R-R_\odot}{h_R}) \times exp(-\frac{\lvert z\rvert}{h_z})$ with $h_R = 4500$ pc, $h_z = 140$ pc		(Robin et al. 2003)
Central mass	$\rho_c \times \left(1+\left(\frac{a}{R_c}\right)^2\right)^{-5/2}$ where $a^2 = (X^2+Y^2+Z^2)$ with $R_c =$, $\rho_c =$		This work
Dark halo	$\frac{\rho_c}{(1.+(a/R_c)^2)}$ where $a^2 = (X^2+Y^2+(Z/q)^2)$ with $q = 1$, $R_c = 2697$ pc and $\rho_c = 0.1079$		(Robin et al. 2003)

6 Main components = Total mass ~ 0.1x10^12 Msun

Dynamically self-consistent evolutionary model of the Milky Way



RC stars to be include from Bovy's data

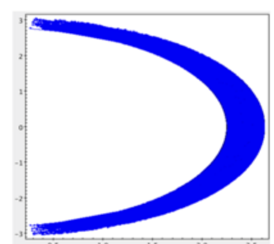


Globular clusters in the Milky Way:

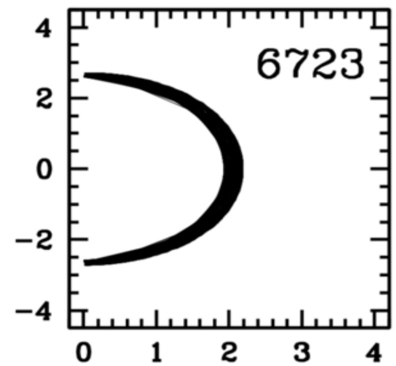
- Many orbital parameters need to be recomputed
- Tidal radii
- Destruction rates
- etc …

$$r_* = \left[\frac{GM_c}{\left(\frac{\partial F_{x'}}{\partial x'}\right)_{\mathbf{r}'=0} + \dot{\theta}^2 + \dot{\varphi}^2 \sin^2\theta}\right]^{1/3}$$

GravPot16
10 Gyr



Moreno et al. (2014)

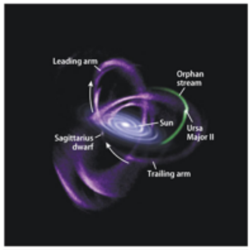


Resonant Families of Orbits in the Milky Way as Mapped by DR13 APOGEE-RC stars: Preliminary results

J. G. Fernandez-Trincado, A. C. Robin, E. Moreno, B. Pichardo, O. Valenzuela, K. Holley-Bockelmann, C. Nitschelm, 2016, + Apogee collaboration

(*SF2A proceeding, and MNRAS in prep.*)

Context



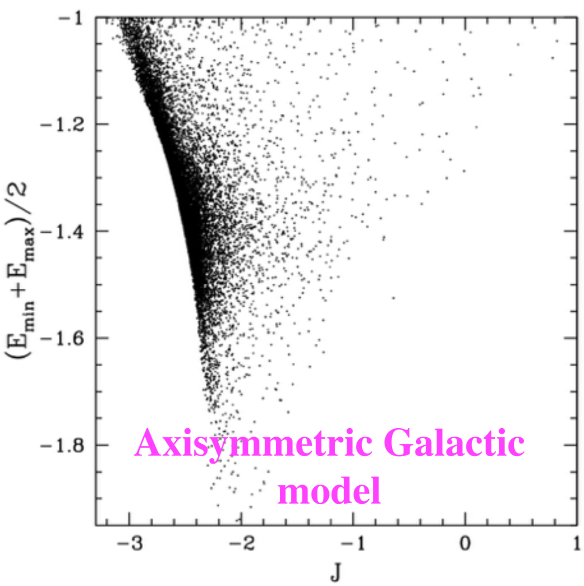
- stellar streams
- stellar associations

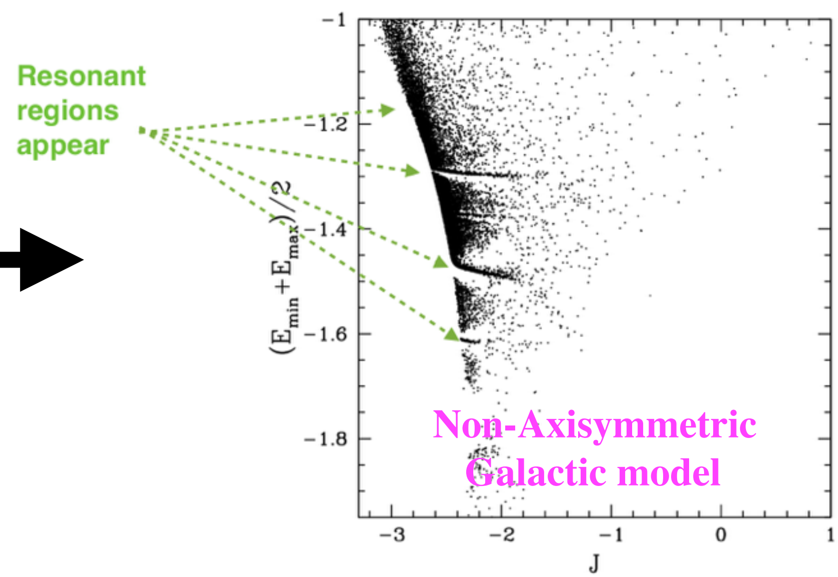
called

'stellar moving groups'

- Open clusters
- Dwarf galaxies
- Globular clusters

Perturbations by resonances with the Galactic bar and/or spiral arms and also triaxially shaped dark matter haloes





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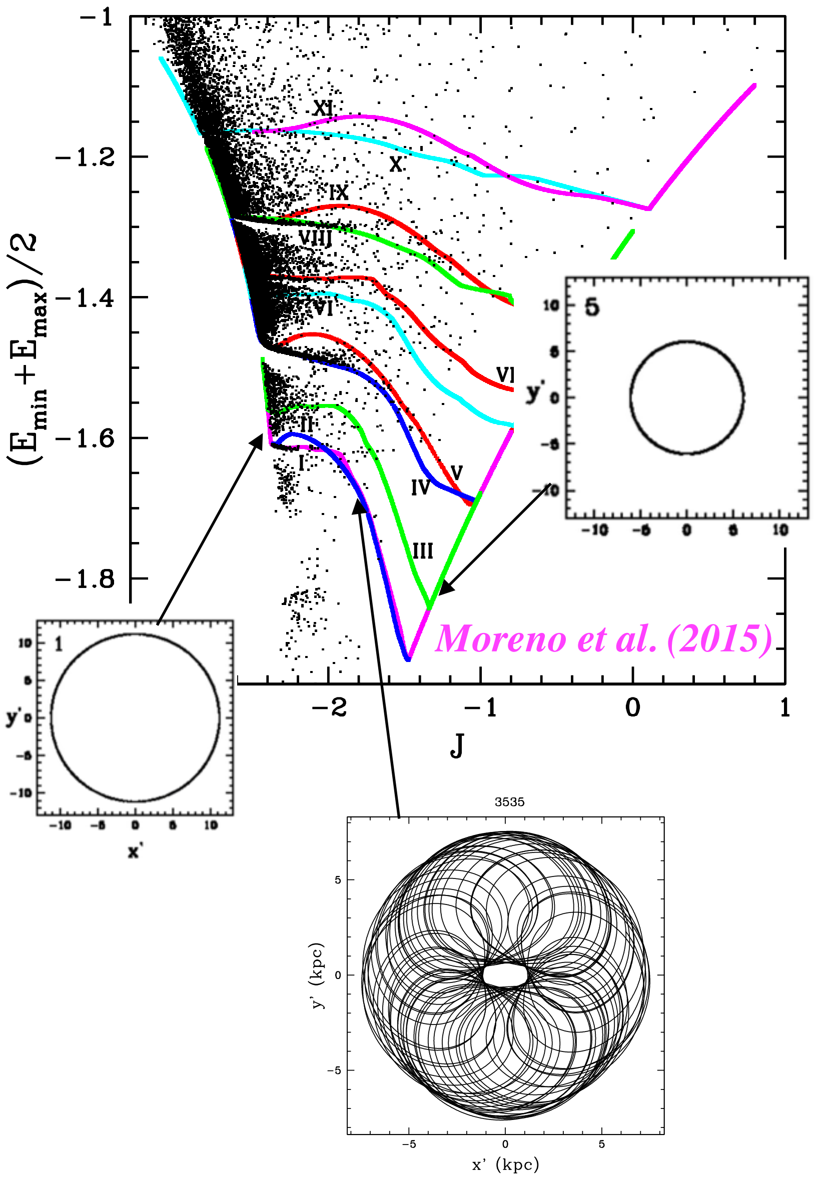
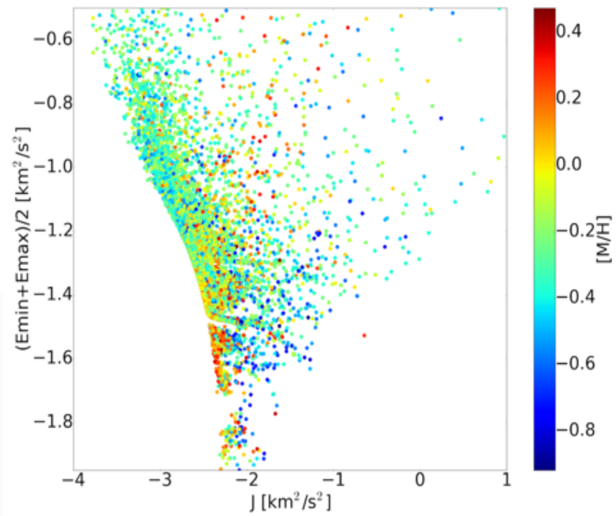
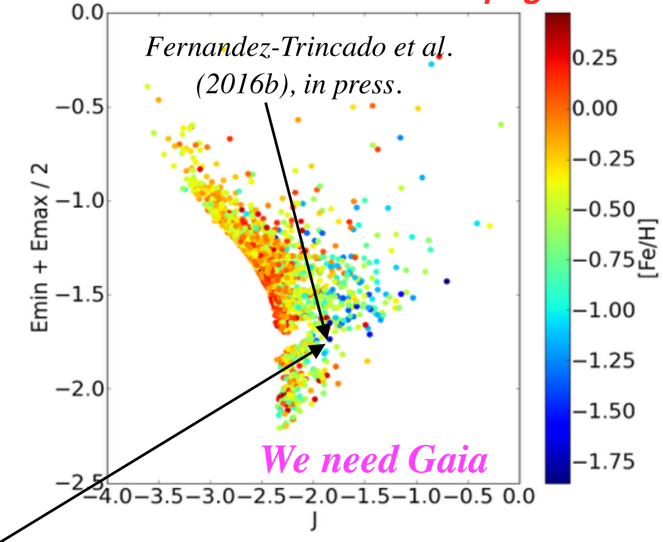


Chemical correlation?

RC stars from SDSS-IV/Apogee-2

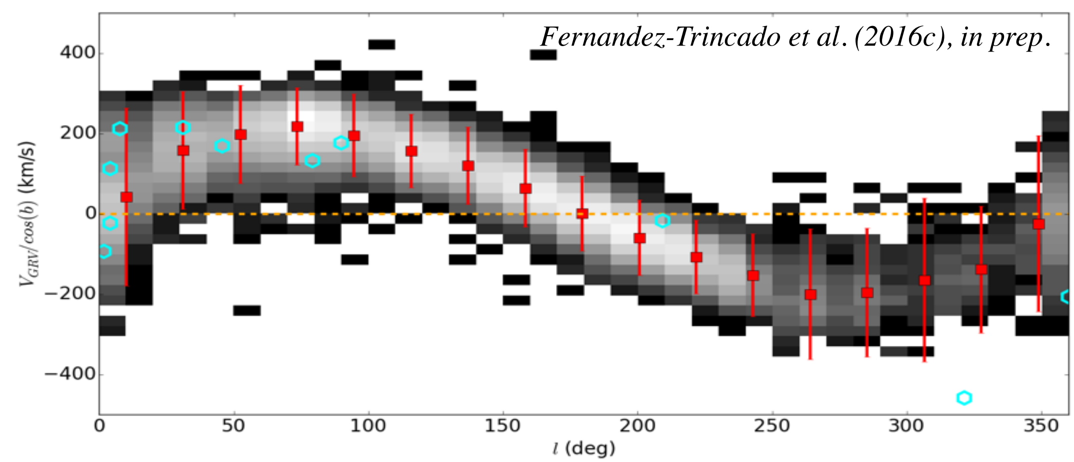


Giant stars from SDSS-IV/Apogee-2



Discovery of Peculiar stars in the Galactic Plane of the Milky Way with extreme GC-like abundance patterns

A possible origin mechanism is bar-induced resonant trapping



ACKNOWLEDGEMENTS

This paper represents an effort by both the SDSS-III and SDSS-IV collaborations. Funding for SDSS-III was provided by the Alfred P. Sloan Foundation, the Participating Institutions, the National Science Foundation, and the U.S. Department of Energy Office of Science. Funding for the Sloan Digital Sky Survey IV has been provided by the Alfred P. Sloan Foundation, the U.S. Department of Energy Office of Science, and the Participating Institutions. SDSS-IV acknowledges support and resources from the Center for High-Performance Computing at the University of Utah. The SDSS web site is www.sdss.org.

SDSS-IV is managed by the Astrophysical Research Consortium for the Participating Institutions of the SDSS Collaboration including the Brazilian Participation Group, the Carnegie Institution for Science, Carnegie Mellon University, the Chilean Participation Group, the French Participation Group, Harvard-Smithsonian Center for Astrophysics, Instituto de Astrof\'isica de Canarias, The Johns Hopkins University, Kavli Institute for the Physics and Mathematics of the Universe (IPMU) / University of Tokyo, Lawrence Berkeley National Laboratory, Leibniz Institut f\"ur Astrophysik Potsdam (AIP), Max-Planck-Institut f\"ur Astronomie (MPIA Heidelberg), Max-Planck-Institut f\"ur Astrophysik (MPA Garching), Max-Planck-Institut f\"ur Extraterrestrische Physik (MPE), National Astronomical Observatory of China, New Mexico State University, New York University, University of Notre Dame, Observat\'ario Nacional / MCTI, The Ohio State University, Pennsylvania State University, Shanghai Astronomical Observatory, United Kingdom Participation Group, Universidad Nacional Aut\'onoma de M\'exico, University of Arizona, University of Colorado Boulder, University of Portsmouth, University of Utah, University of Virginia, University of Washington, University of Wisconsin, Vanderbilt University, and Yale University.