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Magnetic fields in massive star-forming regions (MagMaR) IV: Tracing the Magnetic Fields in the O-type protostellar system IRAS 16547−4247

Luis A. Zapata, Patricio Sanhueza, Guido Garay, Stella Ocasio, Jonathan M. Giron, Luis F. Rodríguez, Paulo Cortes, Kaoli Patrick, Maria T. Beltran, Kate Pattle, Henrik Beuther, Piyali Saha, Wenyu Jiao, Fengwei Xu, Xing Wuber Lu, Fernandez Olguin, Shanghuo Li, Mr. Stephen, Jongsoo Kim, Sung-ju Cheon, Junhao Chouchuang, Kaho Morii, Eun-jung Chung, Jin-Hee Bhang, Hong Hoang, Ki-Ryun Lee, et al. (22 additional authors not shown)

Abstract: We present the MagMaR survey, a SOFIA/HAWC+ polarimetric survey toward massive star-forming regions. The role that the magnetic fields play in their early evolutionary phase is still far from being completely understood. In this present manuscript, we present the case of the high-mass protostellar system IRAS 16547−4247 (hereafter G345.4). This is a massive protostellar system with a luminosity of $\sim 10^5$ L$_\odot$ (for a distance of 3.1 kpc) and $M^{\rm H_2O}$ (2) – (3, C^{18}O – 6), and $M^{\rm H_2O}$ (2) – 2 line observations with a high angular resolution (~0.4 ...) More

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Three-stage Formation of Cyclic Carbonates after Marinase Snowball Gelation Consistent with Depositional Timescales and Geochemistry

Trent R. Thomas, Chad E. Cowling

Abstract: At least two global "Snowball Earth" glaciations occurred during the Neoproterozoic Era (1000–538.8 million years ago), and the Marinase Snowball Gelation Hypothesis (MSGH) proposes that the marinase enzyme underwent a three-stage transition that directly exerted global deposition. Provisional environmental conditions that created the cyclic carbonates lack consensus largely because single hypotheses fail to... More

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Finding analysis and research multimodal Black Hole Image Dataset and Characterizer (KPCV) species

Kaoli Patrick, Dr. Thomson, Jean-Baptiste Kiffer, Jaime Wang, Chih-Chun Chuo, Ashley Walker, Luke Chesney, Jerin Louis, Daniel Gomez, Stephen J. Smith Weber, Jamie Bolin, Randal Barron, Chris Lintott, Mike Read, Claudia Scarlata, Brooke Simmons, Mike Walmsley, Kyle Willett

Abstract: We present morphological classifications based on Galaxy Zoo analysis of 71,052 galaxies with imaging from the Hubble Space Telescope Advanced Camera for Surveys (HST/ACS) and Subaru Hyper Suprime-Cam (HSC). Galaxy Zoo 2 (GZ2) samples, so also have gz2 imaging from the Sloan Digital Sky Survey. An identical classification tree, and only weighting/aggregation was applied to both UKIDSS and GZ2. ... More

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Eight New Substellar Hyades Candidates from the UKIRT Hemisphere Survey

Aaron C. Schneider, Eduardo Martin, Ben Burningham, Sofia Jeffrey, A. Muro, Frederick J. Vrba, Christopher Bruzenuna, Stephen J. Williams, Michael C. Liu, Alexa Bravo, Jacqueline K. Faherty, Austin Rothermich, Emily Calvano, Dan Caselden, Martin Cushing, Adam Burgasser, Ryan Kiman, Jonathan Gagné, Adam Schneider, Christopher Tinney, Ivan Baraffe

Abstract: We have used the UKIRT Hemisphere Survey (UHS) combined with the UKIDSS Galactic Cluster Survey (GCS), the UKIDSS Galactic Plane Survey (GPS), and the CARMENCITA catalog to search for new substellar members of the nearest open cluster to the Sun, the Hyades. Eight new substellar Hyades candidates were identified and observed with the GeminiGMOS near-infrared spectrograph. All eight objects... More

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Revised LOFAR super limits on the 21-cm signal power spectrum at $z \approx 9.1$ using Machine Learning and Gaussian Process Regression

Anshuman Acharya, Florent Mertens, Benedetta Ciardi, Raghunathan Ghara, Léon V. E. Koopmans, Saleem Zaroubi

Abstract: The epoch of Reionization (EoR) marks the transition from a fully neutral Universe to a fully ionized one. The Low Frequency Array (LOFAR) is measure the high-redshift 21-cm signal power spectrum has been shown to have issues of signal loss when using the standard foreground modelling approach. In recent years, new techniques have recently introduced counterpart terms obtained by using a Machine Learning based framework. ... More

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Single-Star Warm-gamma Pulsars Tend to be Aligned, Even Around Hot Stellar Hosts: No $\Omega_{\rm gal} - \lambda$ Dependency

Kaoru Ito, Wang, Maxine Rice, Singhs Wang, Shubham Kanodia, Tie Du, Sarah E. Logsdon, Heidi Schweiker, Johanna K. Teske, Paul Butler, Jeffrey D. Crane, Stephen A. Shectman, Samuel N. Quinn, Ideado B. Kozlos, Hugh P. Osborn, Robert T. Zellem, Jonathan Irwin, Matthew Bailes, Ashley Chontos, Carolina Cuesta-Molina, Howard M. Relles, George R. Ricker, Sara Seager, Joshua N. Winn, Jon M. Jenkins

Abstract: The stellar obliquity distribution of warm-gamma systems is crucial for constraining the dynamical history of gas giant exoplanets, as the warm-gamma stellar obliquities tend to be aligned with the stellar rotation axis. However, the sample size of warm-gamma systems with measured stellar obliquities has historically been limited compared to that of hot gamma, particularly in hot-star systems. It is... More

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Ocean Circulation on Tide-locked Lava Worlds, Part I: An Idealized 2D Numerical Model

Yuanxia Lai, Lan Yang, Wanyang Fang

Abstract: Lava worlds are exoplanets with the dayside of tide-locked planets if surface temperature exceeds the melting temperature of typical rocks. At highly primitive stages, the planet's interior is fully molten and the atmosphere and ocean are dominated by the surface and atmosphere of lava planets will soon be solution. In most previous studies of lava planets, the system is typically assumed to be synchronous ... More

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Ocean Circulation on Tide-locked Lava Worlds, Part II: Scalings

Yuanxia Lai, Wanyang Fang, Lan Yang

Abstract: On tidally locked lava planets, magma ocean can form on the permanent dayside. The circulation of the magma ocean can be driven by stellar radiation and atmospheric winds. The strength of ocean circulation and the depth of the magma ocean determine the surface temperature and the extent of the magma ocean. In this study, we develop scaling laws for the magma ocean dynamics. ... More

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Detection of the $(1,0)$ 4.5 μm emission line from the $z = 6.04$ quasar J2054-0005

Nozomi Ishii, Takuya Hashimoto, Carl Fechnbach, Matus Rybak, Akio K. Inoue, Tomonari McNamara, Daiko Donowaki, Seiji Fujimoto, Douglas Sadler, Naoki Kurai, Hiroshi Matsuo, Naoki Yoshida, Ryoma Ando, Ryuichi Kurosawa, Takashi Tonegawa, Takuya Nakazato, Wataru Osone, Yuma Sugahara, Mitsuhiko Kosaka, Kiki Wakasugi, Hidenobu Yajima, Tomo J. C. Baba, Yoshinobu Fudamoto, Romain A. Meyer, Fabian Walter, et al. (2 additional authors not shown)

Abstract: We report the highest-redshift detection of (1,0) 4.5 μm fundamental vibrations quasar J2054-0005, at $z = 6.04$ based on observations with the Atacama Large Millimeter/submillimeter Array (ALMA). The (1,0) 4.5 μm line is detected at $\sim 5.8\,\sigma$ (3.8 ± 1.0) × 10^{-4} Jy, corresponding to the (1,0) 4.5 μm line flux of $(1.1 \pm 0.3) \times 10^{-17}$ W m^{-2}, which is consistent with the value... More

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Warps induced by satellites on barred and non-barred galaxies

Andreas Widrow, Ralph Schönrich, E. G. Machado

Abstract: Warps are common vertical asymmetries that appear in the outer parts of the galactic disks, bending one part upwards and the other downwards. Many mechanisms can trigger warp formation, including tidal interactions. The interactions with satellites disturn the edges of the disc and can also change the central morphology, impacting, for example, the formation of a central bar. We study the impact of ... More

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Anatomy of the Star-formation in a Tidally Disturbed Dide galaxy: NGC 3718

Chandan Mondal, Jayaram Chengalur Gopi, Sudheesh Dhanya

Abstract: We present a VLT spectral and near-infrared (near-IR) study of the star-forming complexes in the nearby peculiar galaxy NGC 3718, using GMOS, GIRMOS, Spectra and GIRCALS imaging data. The galaxy has a disturbed optical morphology due to the multiple tidal arms, the warped disk and the prominent curved dust lanes, but in the near-IR, it appears to be a bulge-dominated galaxy. We distributed morphology, ... More

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Physical properties of embedded clusters in ATLASGAL clumps with 18 GHz emission

W. Zhou, Peter Kroupa, Sami Dib

Abstract: We have recently compiled and synthesized the embedded clusters of ATLASGAL clumps with 18 hydrogen (H) clumps. The 5 Myr isochrone was used to estimate the bolometric luminosity of each star in an embedded cluster, we also added the accretion luminosity of each star in the embedded cluster. The total bolometric luminosity of synthetic embedded clusters can well fit the observed clumps ... More

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Obligates of Leopard Frogs: 16 New and Updated Hosts, Transmission, and Trends in the Sample of 205 Measurements

Evan Kouchinsky, Steven J. Allkovich, Joshua N. Winn, Davide Gandolfi, John J. Zanazzi, Carina M. Persson, Malcolm Fridlund, Marcus L. Marsicano, Ashley Chontos, Marcelo R. F. Hrejsa Neto, L. Elisa, Allyson Bieryla, Howard Isaacson, Andrew W. Howard, Lauren Weiss, Ashley Chontos, Ashley Chontos, Ashley Chontos, Ashley Chontos

Abstract: Measurements of the obligates in leopard sunspots have revealed some remarkable correlations between stellar and planet properties. We have recently 200 obligates measurements have been obtained through observations of the Rossiter-McLaughlin effect. Here we report on observations of 19 planetary systems that lie in 17 clear detections of the RM effect and 2 less secure detections. ... More

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Apostle-Auriga: Effects of stellar feedback subgrid models on the evolution of angular momentum of galaxy halos

Guanhong Tang, Shihong Liao, Aaubet Fabian, Carlos S. Frenk, Liang Gao, Qi Guo, Shi Shao, Lan Wang, Ruby J. Wright, Xiaohu Yang

Abstract: Utilizing the Apostle-Auriga simulations, which start from the same cosmic initial conditions of Local Group-like systems but run with different galaxy formation subgrid models and hydrodynamic schemes, we study the impact of stellar feedback models on the evolution of angular momentum in dark galaxies. At z = 0, Auriga-like galaxies tend to exhibit higher specific angular momentum compared to... More

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Double-peaked Narrow Emission Line Galaxies in SDSS-IV MaNGA

Ziyi Yang, Shuai Zhang, Hongyan Zhou, Yanxia Zhang, Yuanqi Liu, Xiaoqing Zhao, Zhao Qi, Qing

Abstract: Narrow emission lines in a galaxy spectrum that show double peaks indicate the presence of distinct gas components with different velocities, and its physical origin remains uncertain. This study uses galaxies from the final MaNGA data release to detect double-peaked narrow emission line spectra (DPEs) by examining the double Gaussian profiles of the Hα, Hβ, [O III] and [N II] emission lines. ... More

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Curvature Mapping Method: Mapping Lorentz Force in Orion A

Ninghao Zhao, Guang Ping Li, Xiaofeng Mai

Abstract: Magnetic force is a fundamental force in nature. Although widely believed to be important in counteracting gravitational collapse, its direct measurement remains difficult. Most of the magnetic field in star-forming molecular clouds is active. Past research attempts to measure the importance of magnetic forces using diagnostics such as the mass-to-flux ratio, which measures its strength but not how... More

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Discovery of a Jupiter Analog Misaligned to the Inner Planetary System in HD 73344

Eugene Chiang, Jerome Orosz, Daniel Fabrycky, Jack Lubin, Jason Wright, Jason Wright, Jason Wright