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От Сильченко О.К.

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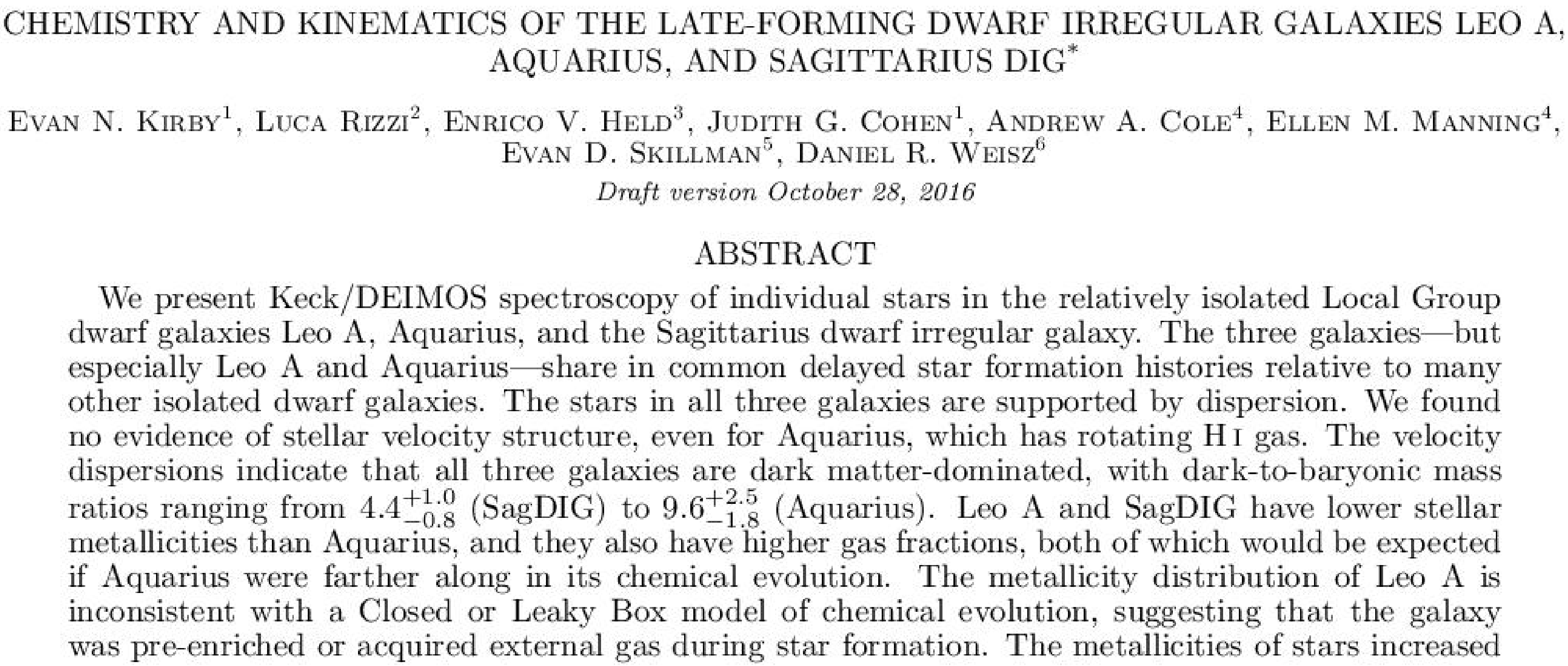

CHEMISTRY AND KINEMATICS OF THE LATE-FORMING DWARF IRREGULAR GALAXIES LEO A, AQUARIUS, AND SAGITTARIUS DIG*

Evan N. Kirby[1], Luca Rizzi[2], Enrico V. Held[3], Judith G. Cohen[1], Andrew A. Cole[4], Ellen M. Manning[4], Evan D. Skillman[5], Daniel R. Weisz[6]

Draft version October 28, 2016

ABSTRACT

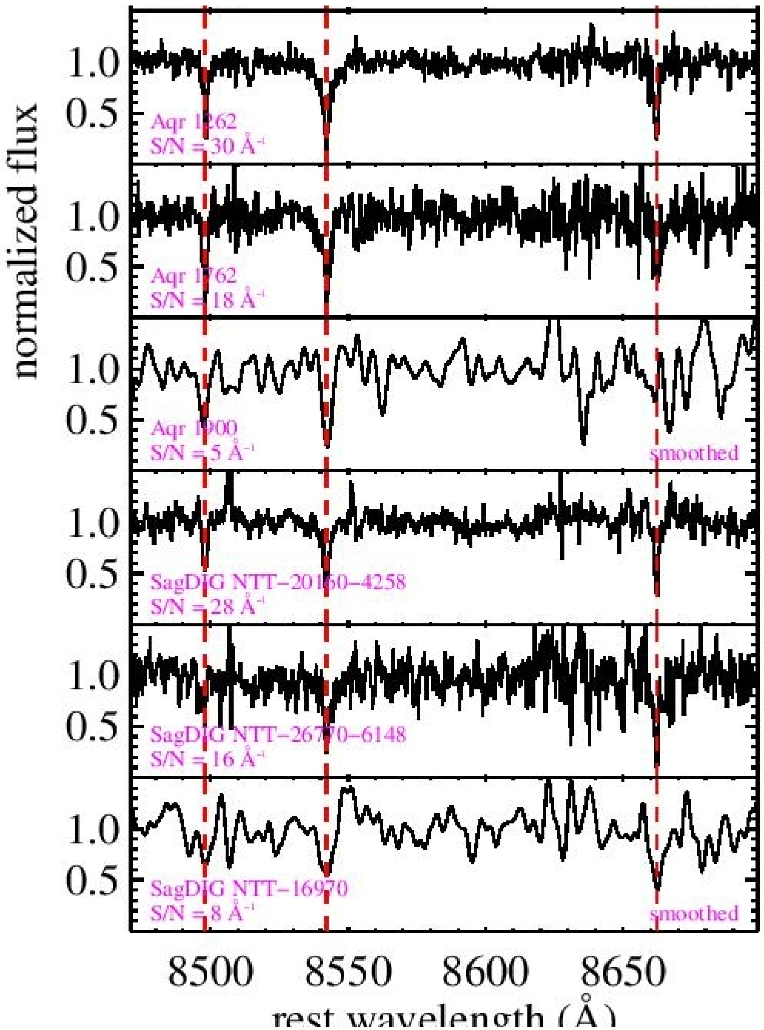
We present Keck/DEIMOS spectroscopy of individual stars in the relatively isolated Local Group dwarf galaxies Leo A, Aquarius, and the Sagittarius dwarf irregular galaxy. The three galaxies—but especially Leo A and Aquarius—share in common delayed star formation histories relative to many other isolated dwarf galaxies. The stars in all three galaxies are supported by dispersion. We found no evidence of stellar velocity structure, even for Aquarius, which has rotating H I gas. The velocity dispersions indicate that all three galaxies are dark matter-dominated, with dark-to-baryonic mass ratios ranging from $4.4^{+1.0}_{-0.8}$ (SagDIG) to $9.6^{+2.5}_{-1.8}$ (Aquarius). Leo A and SagDIG have lower stellar metallicities than Aquarius, and they also have higher gas fractions, both of which would be expected if Aquarius were farther along in its chemical evolution. The metallicity distribution of Leo A is inconsistent with a Closed or Leaky Box model of chemical evolution, suggesting that the galaxy was pre-enriched or acquired external gas during star formation. The metallicities of stars increased

Свойства галактик

Galaxy Properties

Property	Leo A	Aquarius	SagDIG	Unit
		Photometric Properties		
Distance	827 ± 11 (1)	977 ± 45 (2)	1047 ± 53 (3)	kpc
L_V	6.6 ± 1.4 (4)	1.7 ± 0.2 (5)	4.6 ± 1.1 (6)	$10^6\ L_\odot$
r_h	2.15 ± 0.12 (4)	1.10 ± 0.03 (5)	0.91 ± 0.05 (6)	arcmin
r_h	517 ± 29 (4)	312 ± 16 (5)	277 ± 20 (6)	pc
M_*	3.3 ± 0.7 (7)	1.5 ± 0.2 (7)	1.8 ± 0.5 (7)	$10^6\ M_\odot$
SFR(Hα)	9.3 (8)	0 (9,10)	8.5 (8)	$10^{-5}\ M_\odot\ \mathrm{yr}^{-1}$
SFR(UV)	6.0 (8)	0 (11)	7.2 (8)	$10^{-4}\ M_\odot\ \mathrm{yr}^{-1}$
		Gas Properties		
M(H I)	7.4 ± 0.8 (12)	2.2 ± 0.3 (12)	8.3 ± 1.2 (12)	$10^6\ M_\odot$
$\langle v_{\mathrm{helio}} \rangle$ (H I)	23.7 (12)	−140.3 (12)	−79.2 (12)	km s^{-1}
σ_v (H I)	6.2 (12)	6.7 (12)	8.2 (12)	km s^{-1}
		Stellar Dynamical Properties		
N_{member}	127	25	45	
$\langle v_{\mathrm{helio}} \rangle$	$26.2^{+1.0}_{-0.9}$	$-141.8^{+1.8}_{-2.0}$	-78.4 ± 1.6	km s^{-1}
v_{GSR}	−13.9	−30.7	6.2	km s^{-1}
σ_v	$9.0^{+0.8}_{-0.6}$	$7.8^{+1.8}_{-1.1}$	$9.4^{+1.5}_{-1.1}$	km s^{-1}
$M_{1/2}$[a]	3.9 ± 0.4	$1.8^{+0.4}_{-0.3}$	$2.3^{+0.4}_{-0.3}$	$10^7\ M_\odot$
$(M/L_V)_{1/2}$[b]	12 ± 3	21^{+6}_{-4}	10 ± 3	$M_\odot\ L_\odot^{-1}$
$(M_{\mathrm{tot}}/M_b)_{1/2}$[c]	$7.3^{+1.1}_{-1.0}$	$9.6^{+2.5}_{-1.8}$	$4.4^{+1.0}_{-0.8}$	
		Stellar Chemical Properties		
$\langle$[Fe/H]$\rangle$	$-1.67^{+0.09}_{-0.08}$	-1.50 ± 0.06	$-1.88^{+0.13}_{-0.09}$	

Спектры отдельных звезд



Газ HI – вращается, звезды - нет

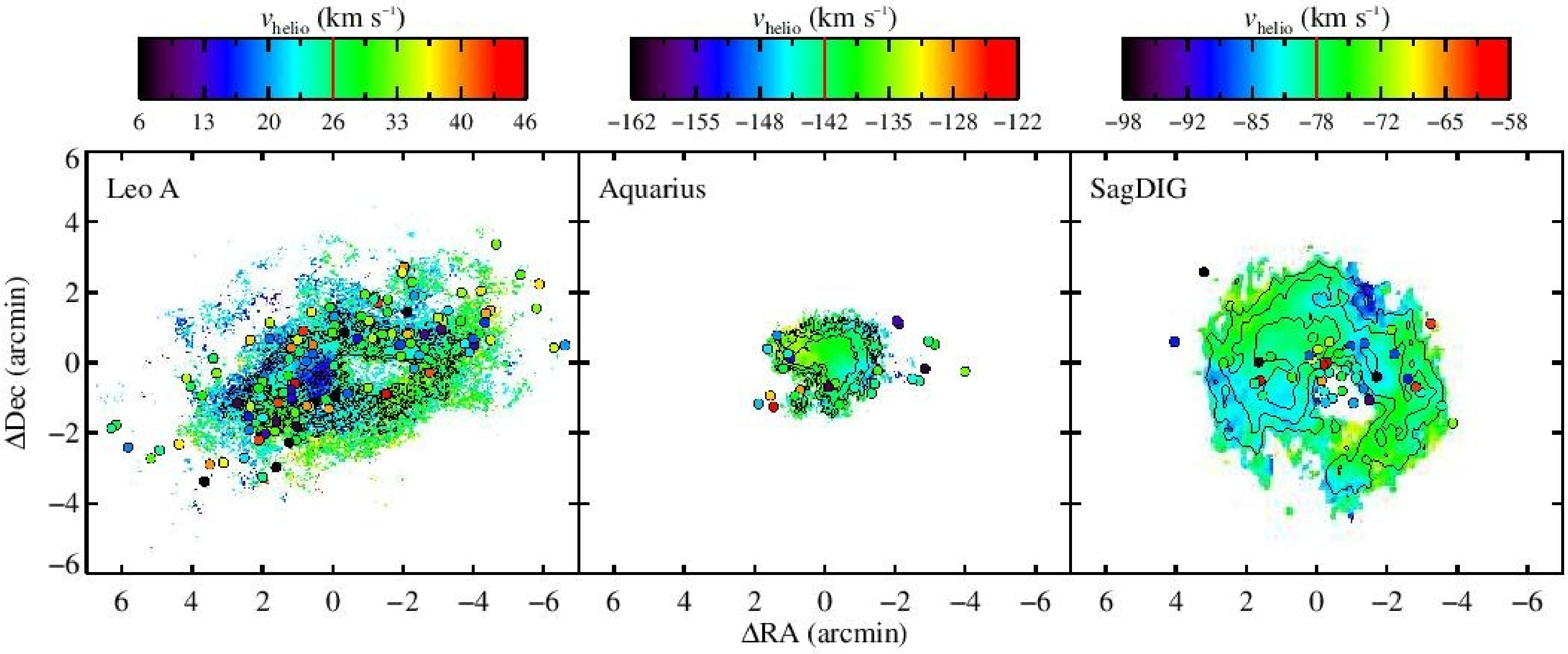
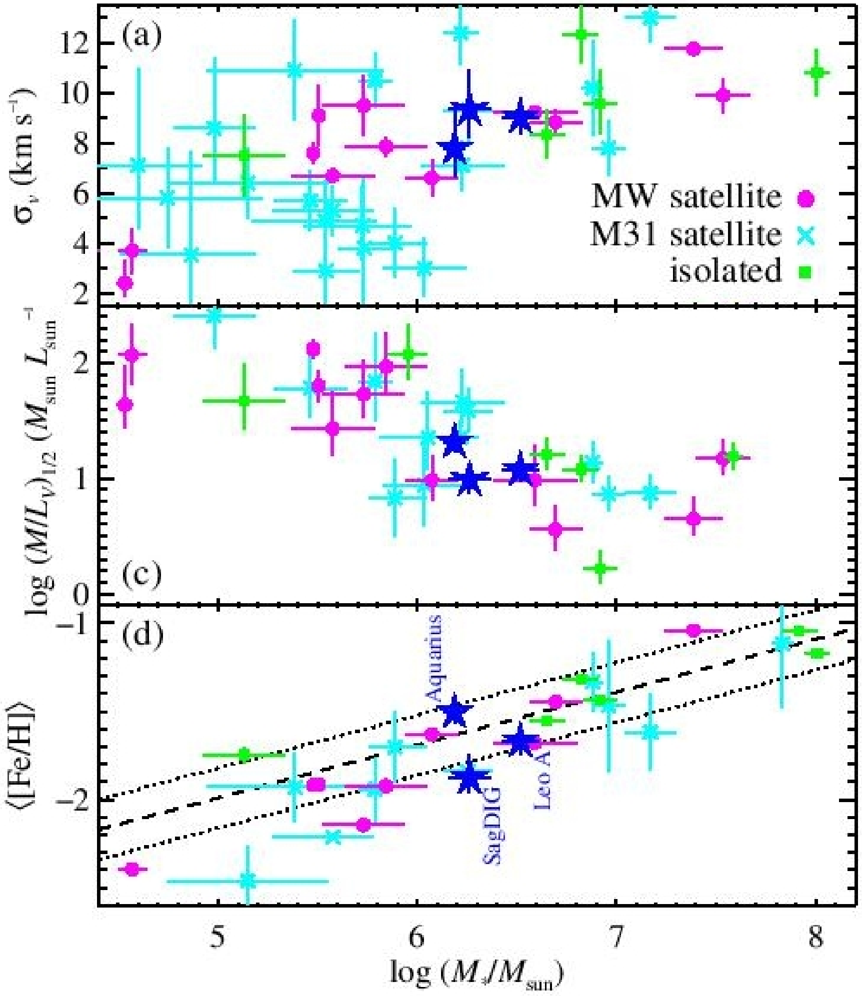


Figure 7. The kinematics of H I gas in Leo A, Aquarius, and SagDIG, as observed by LITTLE THINGS (Hunter et al. 2012). The gas distribution is color-coded according to the velocity scale shown at the top of each plot. A red line in the velocity scale indicates the average velocity, $\langle v_{\rm helio} \rangle$, of the stars. The black contours indicate the flux of the 21 cm measurements. The contour levels are 4, 8, and 16 $M_\odot$ pc^{-2} for Leo A and 1.25, 2.5, and 5 $M_\odot$ pc^{-2} for Aquarius and SagDIG. The stars are shown as black-outlined circles. The color of the circle shows the star's velocity on the same color scale as the gas.

dIrr ничем не отличаются от dSph



Подходят только модели с аккрецией?

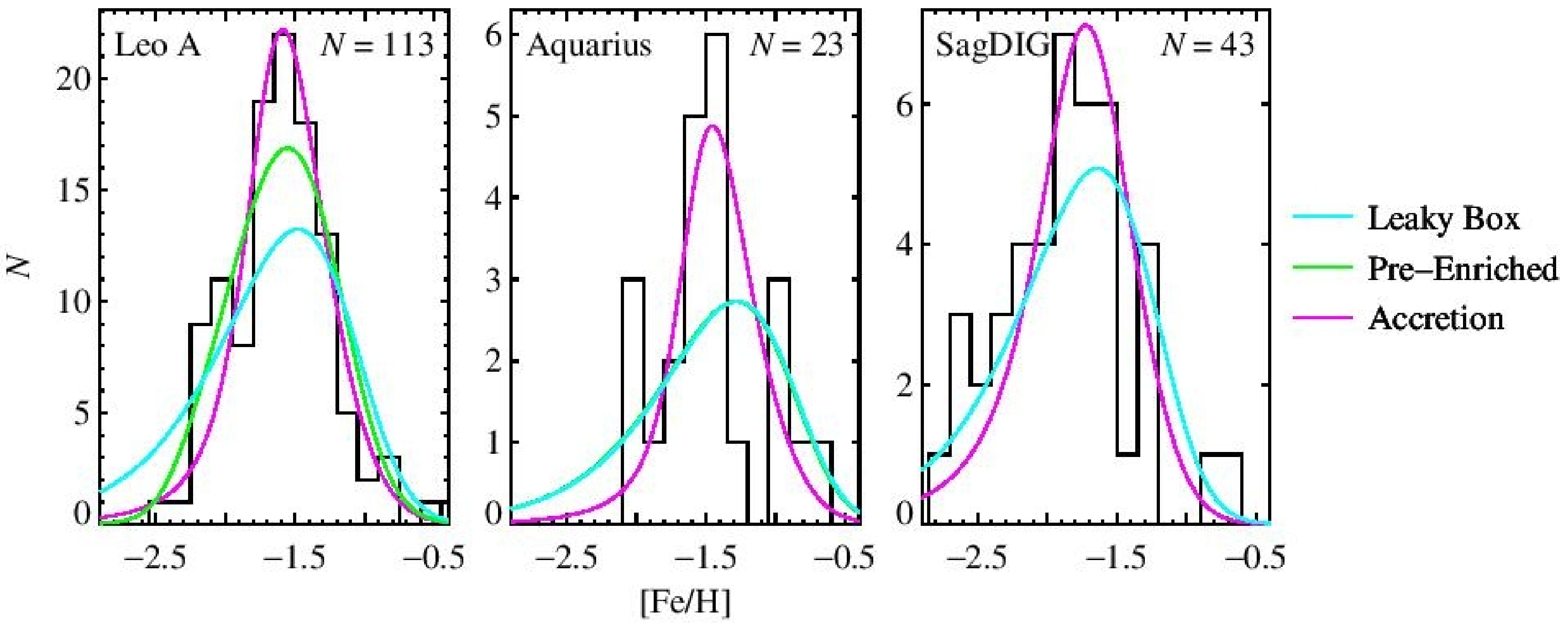
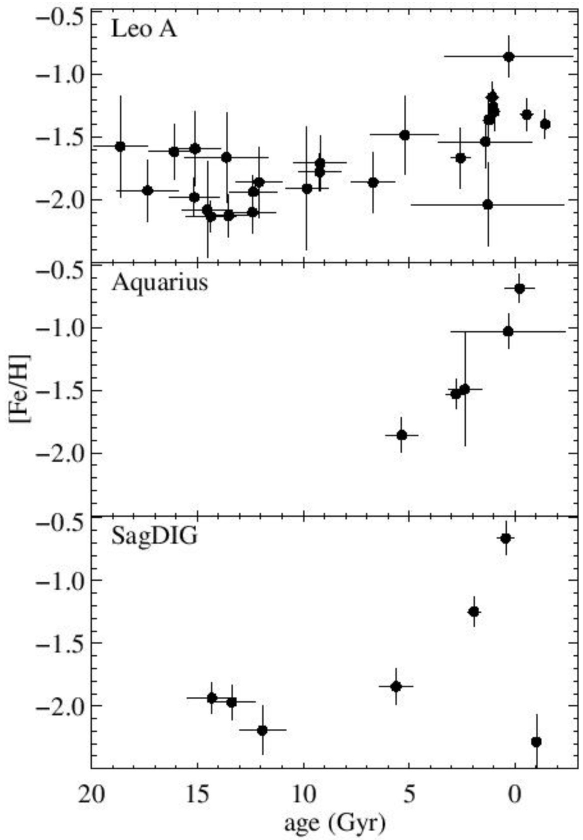
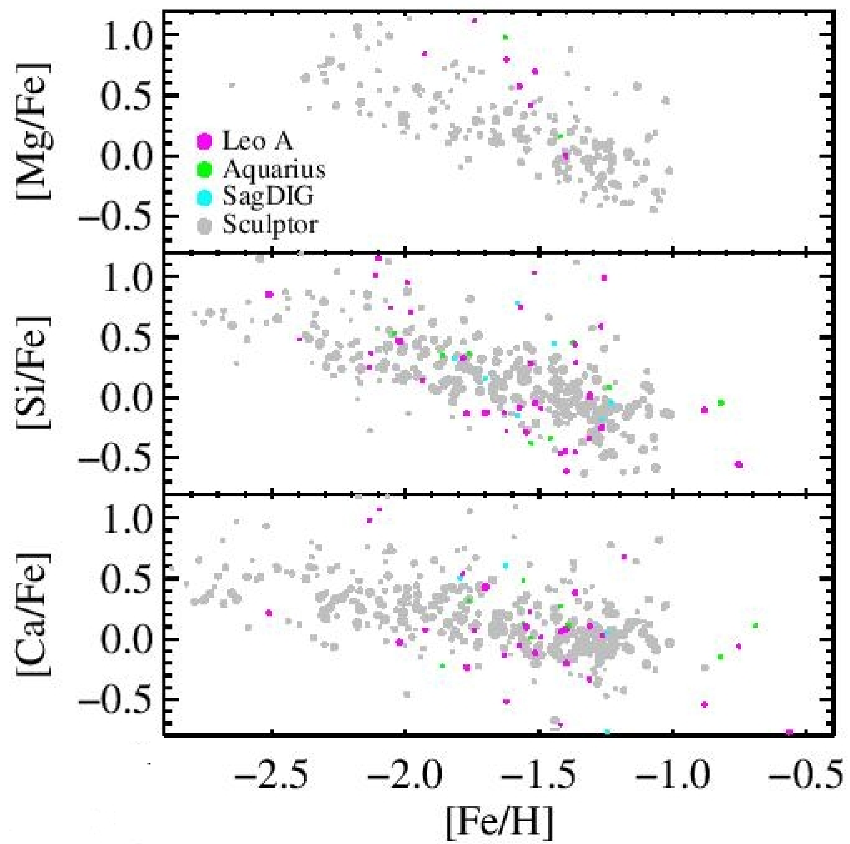


Figure 9. Histograms of [Fe/H] in 0.15 dex bins. The upper right corners show the number of stars in each histogram. The colored curves show the best-fit chemical evolution models.

Эволюция хим. состава звезд





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Ultra diffuse galaxies outside clusters: clues to their formation and evolution

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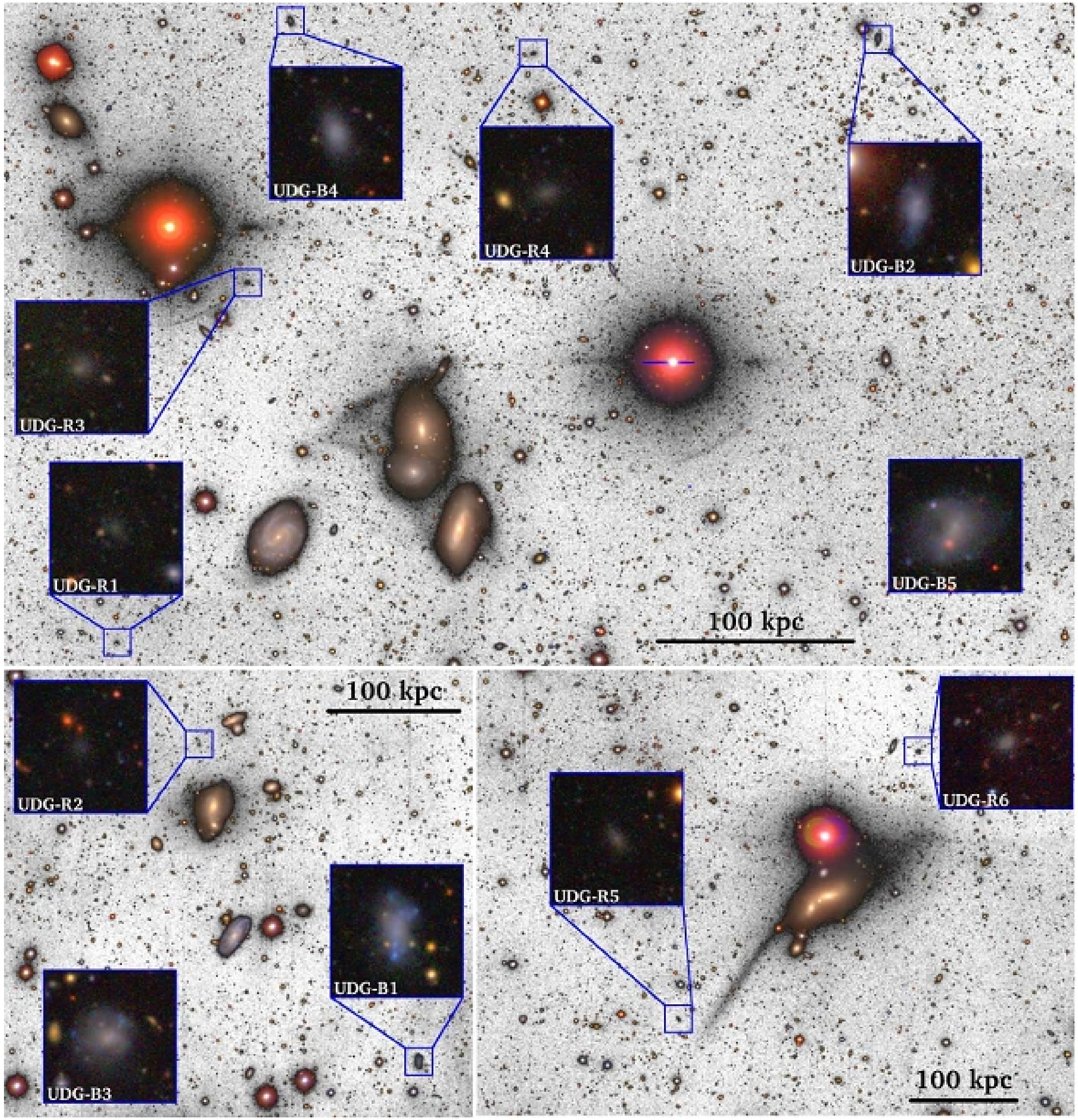
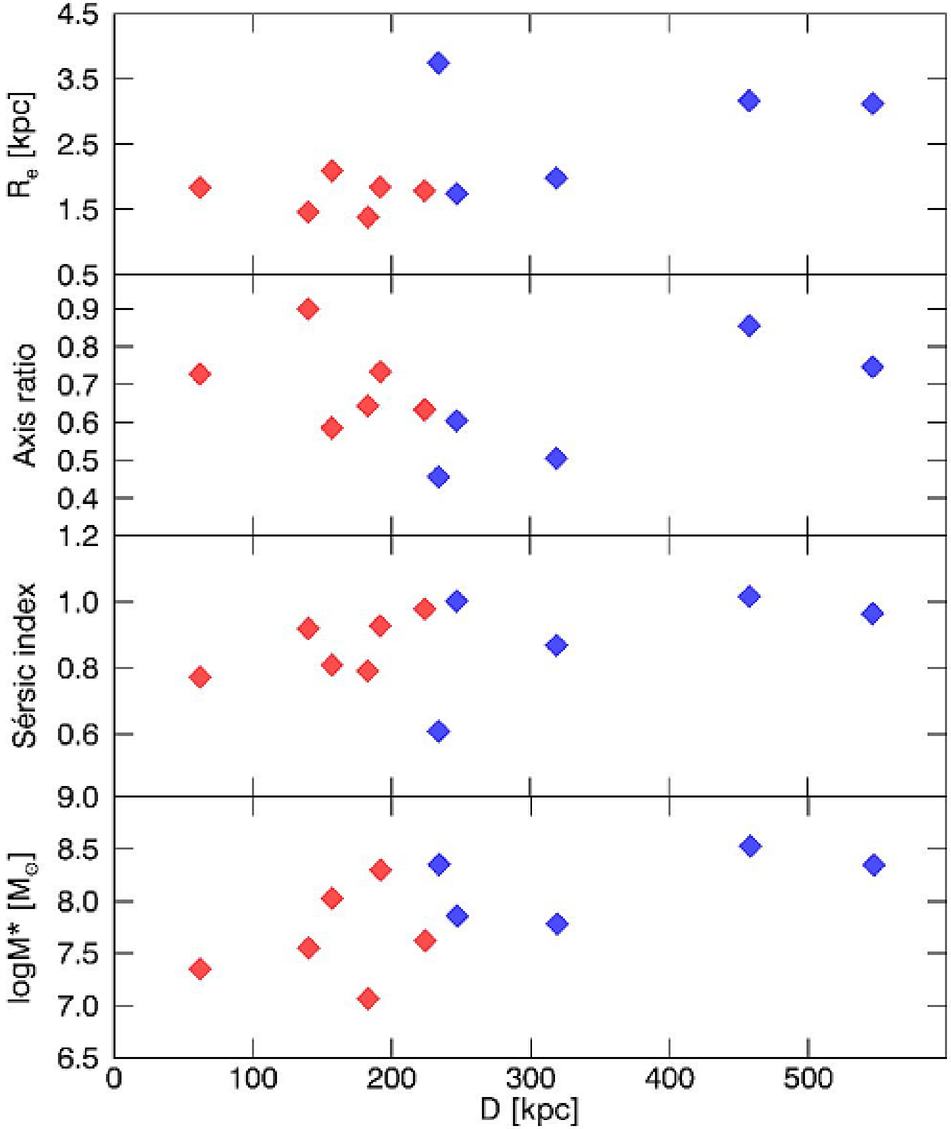
ABSTRACT

We identify six ultra diffuse galaxies (UDGs) outside clusters in three nearby isolated groups ($z \lesssim 0.026$) using very deep imaging in three different SDSS filters (g, r and i bands) from the IAC Stripe82 Legacy Project. By comparing with the abundance of UDGs in rich

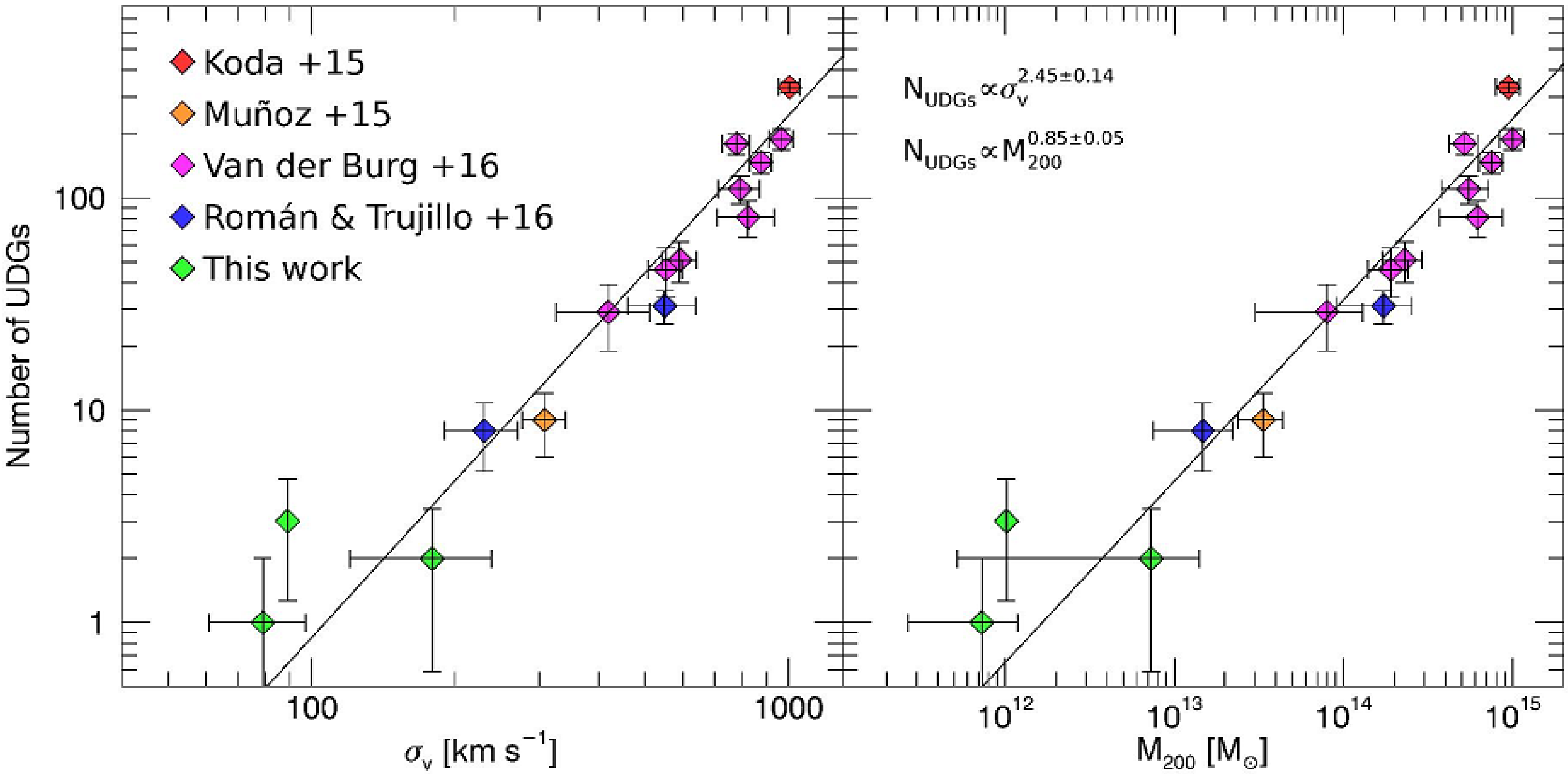


UDG-B4
UDG-R4
UDG-B2
UDG-R3
UDG-R1
UDG-B5
100 kpc
UDG-R2
100 kpc
UDG-B1
UDG-B3
UDG-R5
UDG-R6
100 kpc

Красные и голубые…в зависимости от расстояния до центра группы



Число UDG в зависимости от массы группы



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IMPROVED DYNAMICAL CONSTRAINTS ON THE MASS OF THE CENTRAL BLACK HOLE IN NGC 404

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ABSTRACT

We explore the nucleus of the nearby $10^9 M_\odot$ early-type galaxy (ETGs), NGC 404, using *Hubble Space Telescope* (*HST*)/STIS spectroscopy and WFC3 imaging. We first present evidence for nuclear variability in UV, optical, and infrared filters over a time period of 15 years. This variability adds to the already substantial evidence for an accreting black hole at the center of NGC 404. We then redetermine the dynamical black hole mass in NGC 404 including modeling of the nuclear stellar populations. We combine *HST*/STIS spectroscopy with WFC3 images to create a local color–M/L relation derived from stellar population modeling of the STIS data. We then use this to create a mass model for the nuclear region. We use Jeans modeling to fit this mass model to adaptive optics (AO) stellar kinematic observations from Gemini/NIFS. From our stellar dynamical modeling, we find a 3σ upper limit on the black hole mass of $1.5 \times 10^5 M_\odot$. Given the accretion evidence for a black hole, this upper limit makes NGC 404 the lowest mass central black hole with dynamical mass constraints. We find that the kinematics of H_2 emission line gas show evidence for non-gravitational motions preventing the use of gas dynamical modeling to constrain the black hole mass. Our stellar population modeling also reveals that the central, counter-rotating region of the nuclear cluster is dominated by $\sim$1 Gyr old populations.

Наблюдения на HST

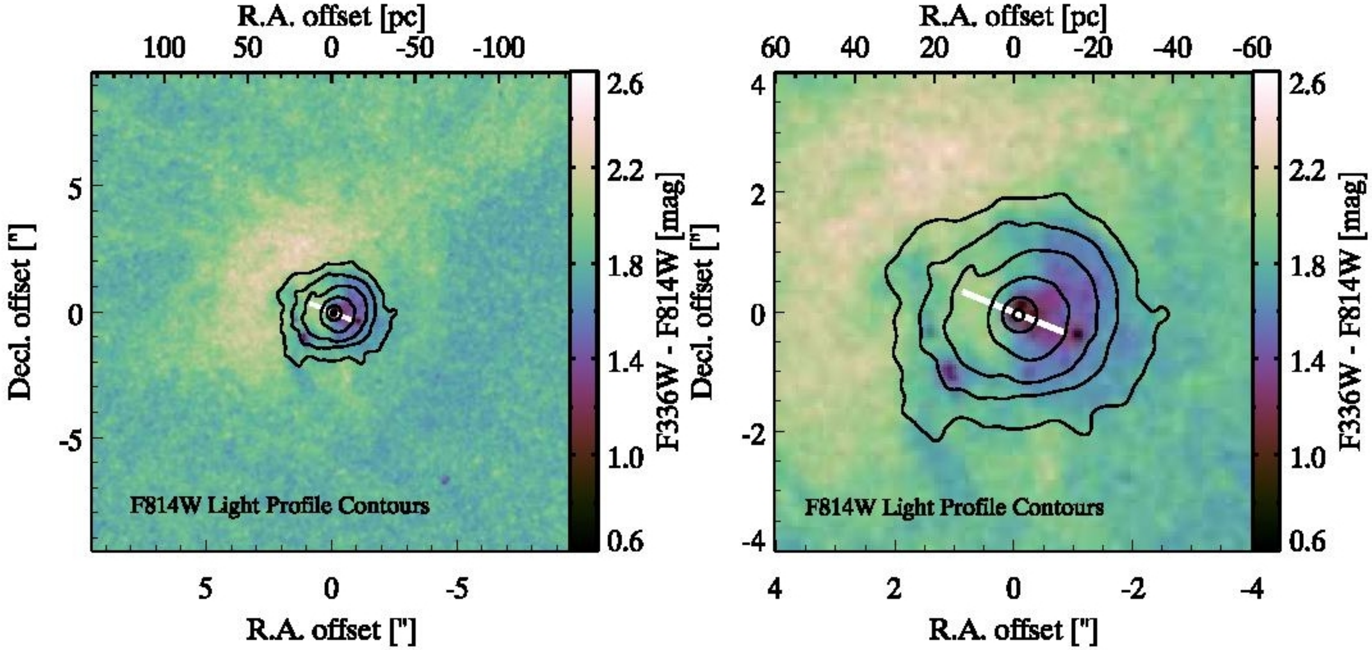


FIG. 5.— Color maps of the nucleus at two different resolutions. The color map shown is the F336W–F814W map that has been

Многокомпонентная структура

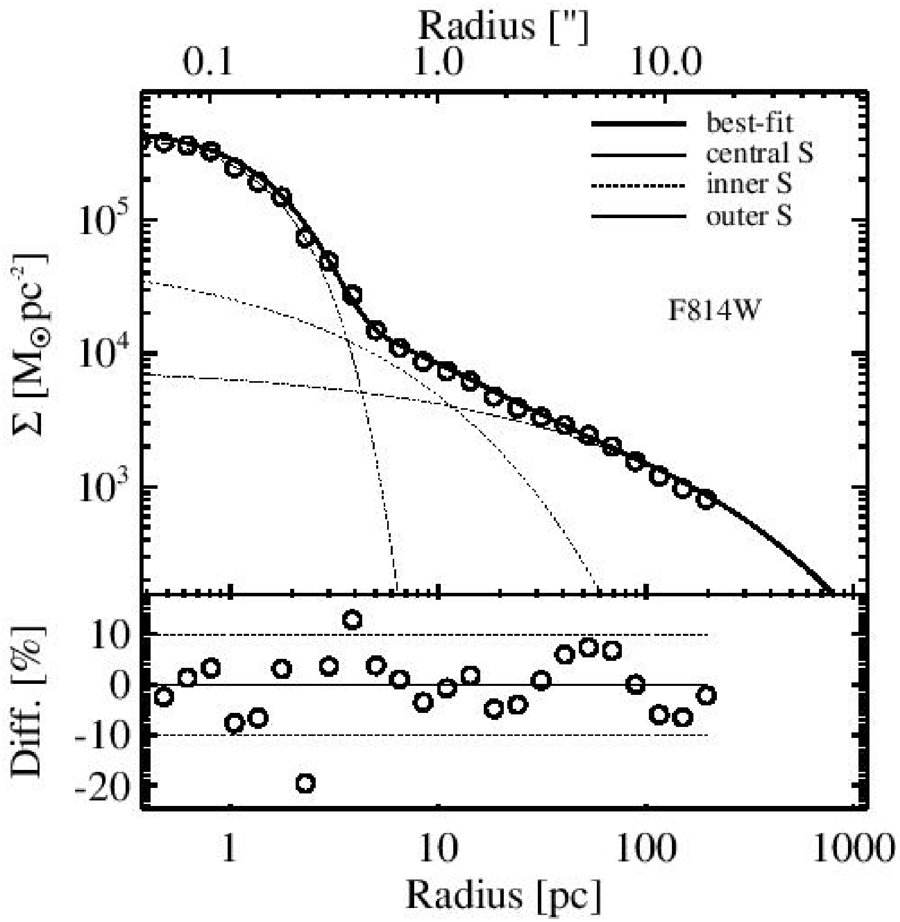


FIG. 10.— Radial mass surface density profile for NGC 404 based on our mass map. *Top panel:* the radial mass surface density profile (open circles), while the solid line shows the GALFIT radial mass surface density model profile including three single Sérsic components (see Table 4). The radial mass surface density profiles for

Нет черной дыры!

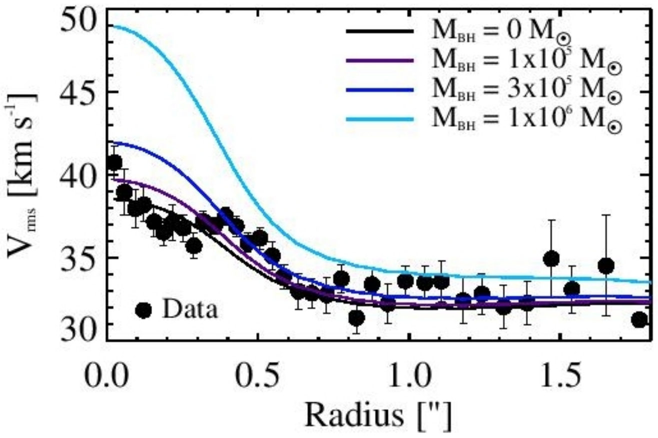


FIG. 12.— 1–D $V_{\rm rms}$ vs. JAM prediction of BH mass models. All models are fixed to the best-fit anisotropy parameter ($\beta_z = 0.05$), mass scaling factor ($\gamma = 0.890$), and inclination angle ($i = 20°$). The data are binned radially. The models show the JAM model predictions at a range of BH masses; the data clearly favors a low BH mass $\lesssim 10^5\, M_\odot$.

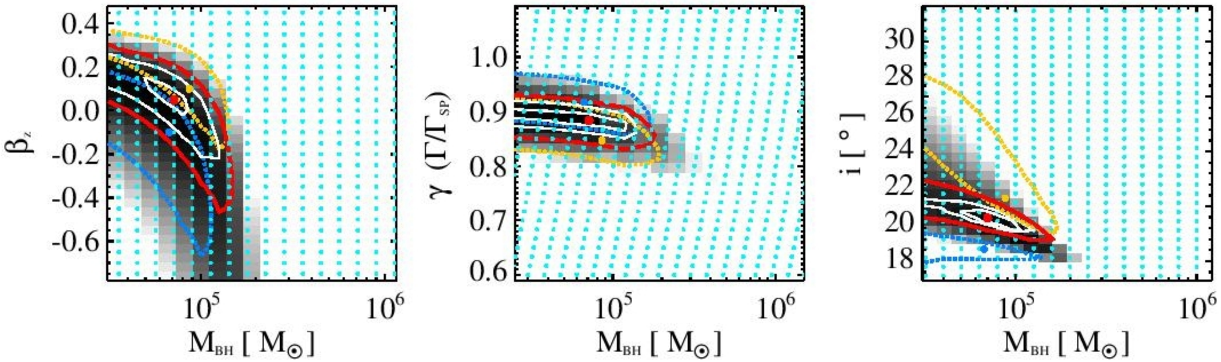
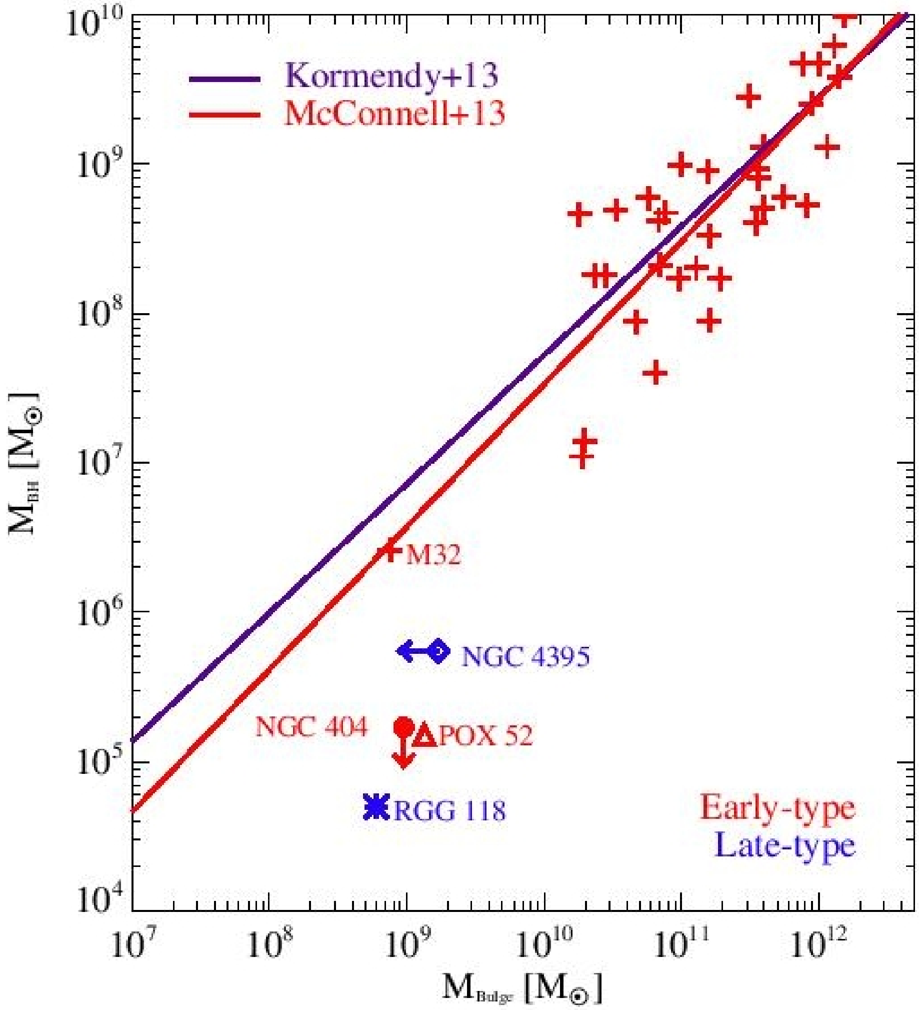


FIG. 13.— Best-fit JAM models using the Gemini/NIFS $V_{\rm rms}$ data and our updated mass map MGE model. The models optimize the four parameters $M_{\rm BH}$, β_z, γ (the ratio between the dynamical mass and the stellar population mass), and i. The cyan dots show the grid of models in each panel. The grayscale shows the likelihood of the best-fit model. *Left panel:* the best-fit anisotropy (β_z) vs. $\rm M_{BH}$. The

А должна быть при такой массе!



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QUANTITATIVE EVALUATION OF GENDER BIAS IN ASTRONOMICAL PUBLICATIONS FROM CITATION COUNTS

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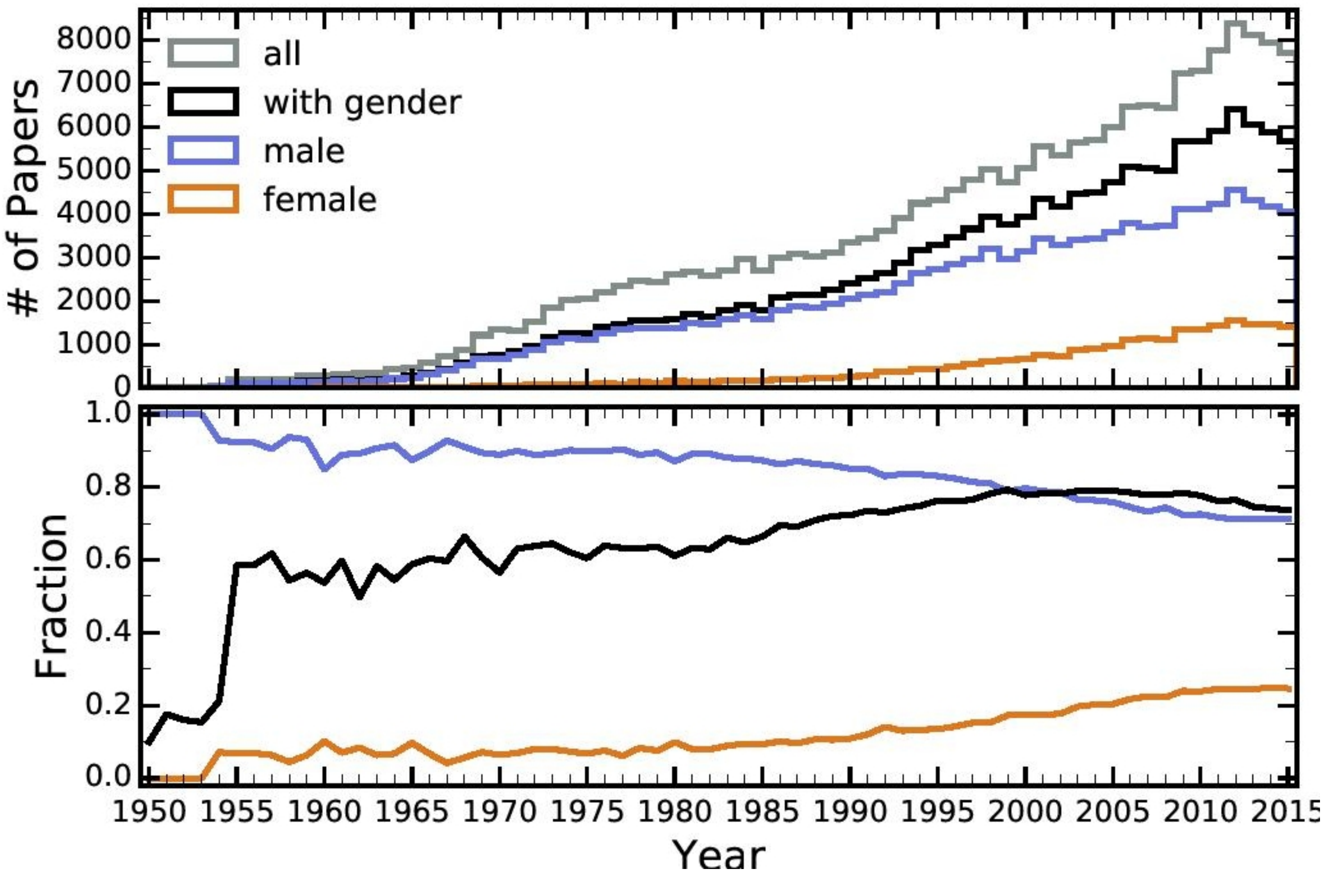
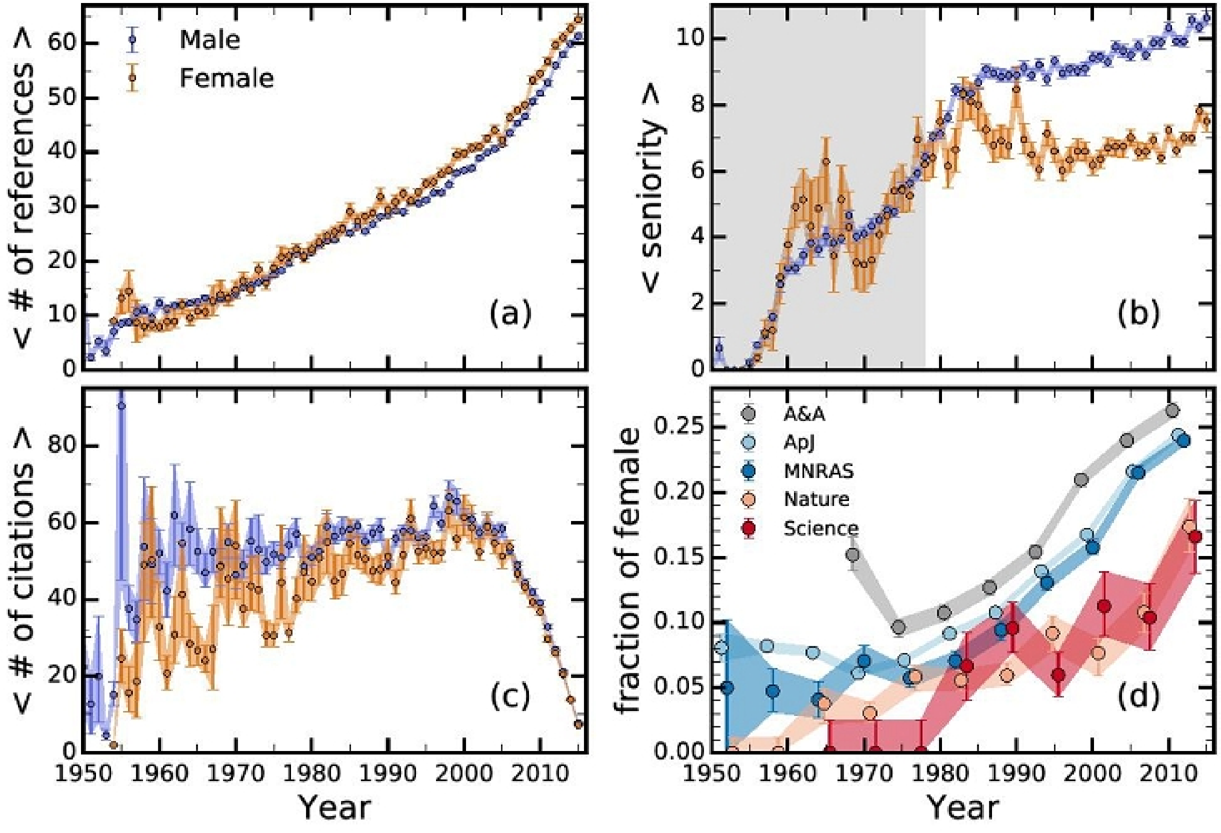
Abstract

We analyze the role of first (leading) author gender on the number of citations that a paper receives, on the publishing frequency and on the self-citing tendency. We consider a complete sample of over 200,000 publications from 1950 to 2015 from five major astronomy journals. We determine the gender of the first author for over 70% of all publications. The fraction of papers which have a female first author has increased from less than 5% in the 1960s to about 25% today. We find that the increase

Число статей



Цитирование у женщин меньше, и в Nature их не печатают…



По цитированию в последнее время разница 5%