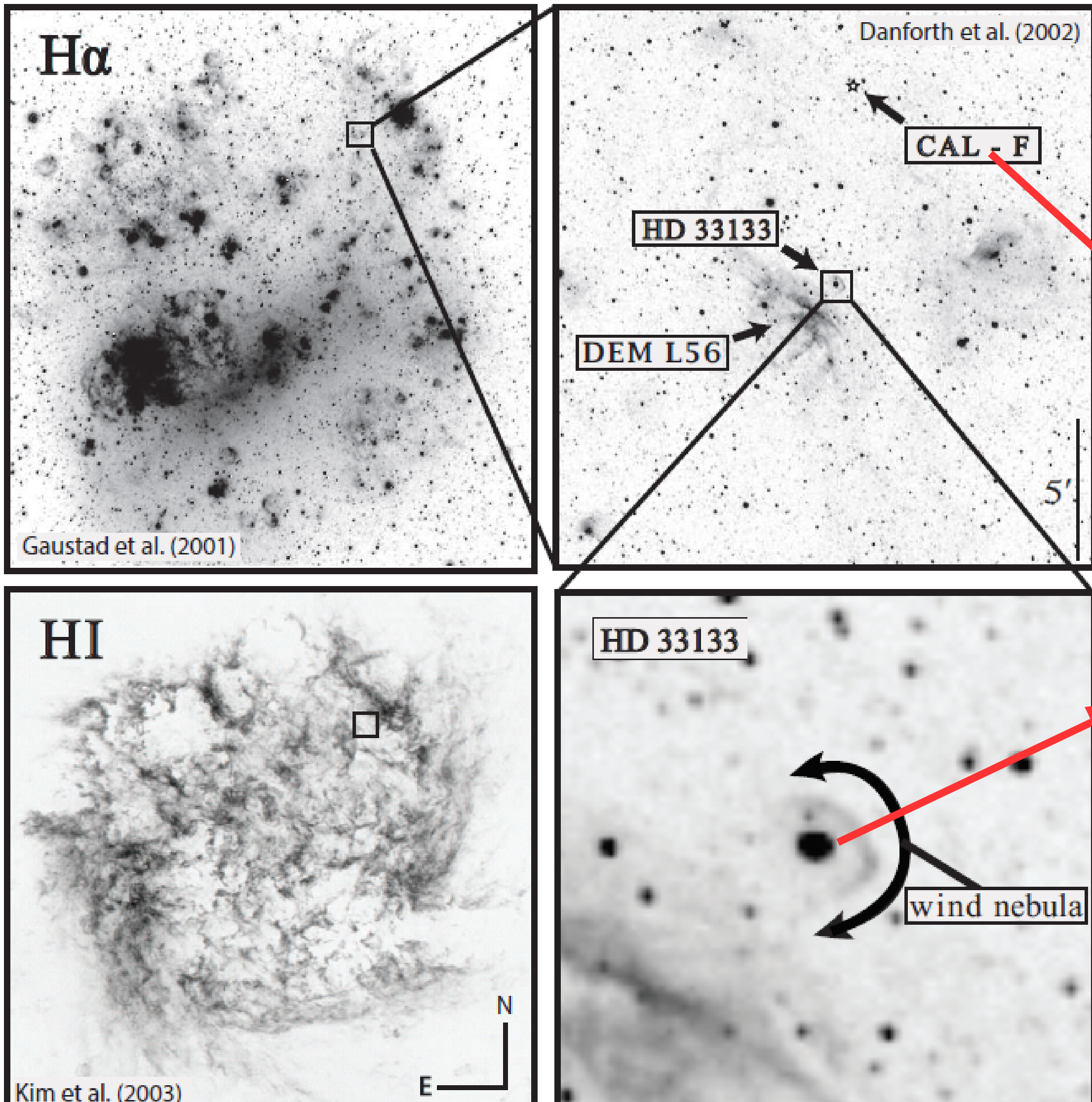
Down-the-barrel and transverse observations of the Large Magellanic Cloud: evidence for a symmetrical galactic wind on the near and far sides of the galaxy

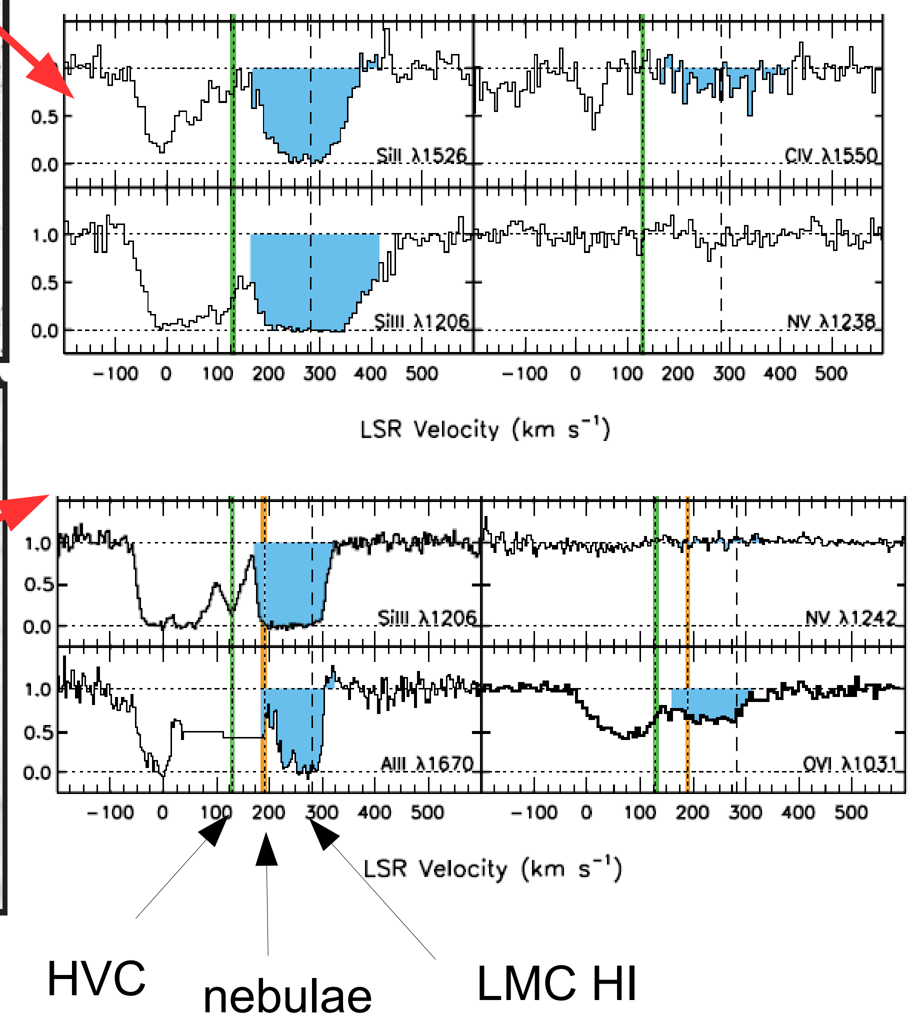
Kat Barger, Nicolas Lehner, J. Chris Howk.

BARGER ET AL.

arXiv:1512.00461



HST COS & STIS
1134-1796 & 1170-1730 A



Семинар VOLGA 04/12/2015, Моисеев

Down-the-barrel and transverse observations of the Large Magellanic Cloud: evidence for a symmetrical galactic wind on the near and far sides of the galaxy

arXiv:1512.00461

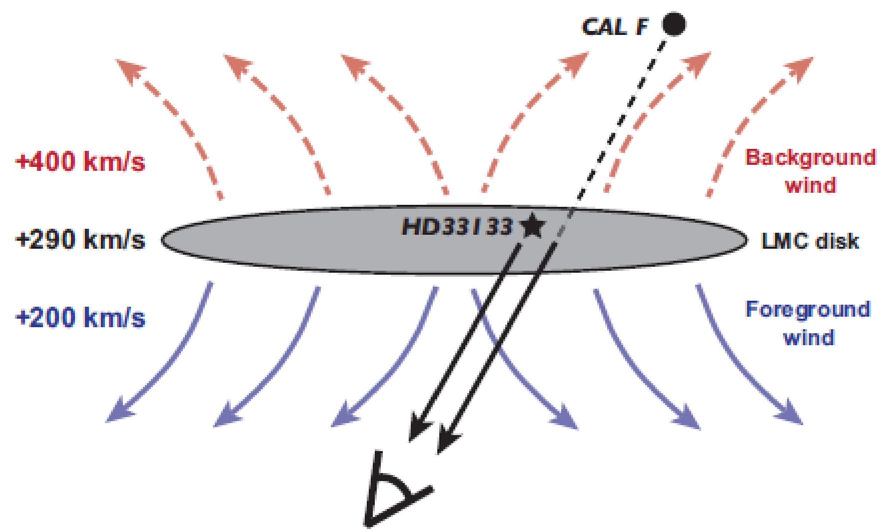


Figure 2. Schematic of the line-of-sight path to the star HD 33133 positioned within the LMC disk and the background AGN CAL F. Solid lines are used

Table 4
Summary of Outflow Masses and Rates[a]

	Gas Phase	M ($10^6\ M_\odot$)	$\dot{M}$ $M_\odot$/ yr^{-1}
Baryons	Low Ions	$\gtrsim 14.6$[b]	$\gtrsim 0.41$
Baryons	High Ions[c]	> 1.4[e]	$> 4.0 \times 10^{-2}$[d]
Metals	Low- & High-Ions	$> 8.0 \times 10^{-2}$	$> 2.2 \times 10^{-3}$

[a] We assume that these winds reach a distance of 3.7 kpc and are moving at a rate of 50 km s^{-1}. We also assume a present-day LMC metallicity of $Z = 0.5\ Z_\odot$ (Russell & Dopita 1992); if these outflows are associated with stellar feedback, then they could be enriched by as much as 2 – 3 times more metals. These values are therefore conservative estimates.
[b] Gas probed by Si II and Si III. Both of these ions are saturated near LMC disk velocities.

Наблюдается многофазное истечение газа (нейтрального, высоко- и низко-ионизованного из диска БМО, скорости истечения – около 100 км/с по обе стороны от диска

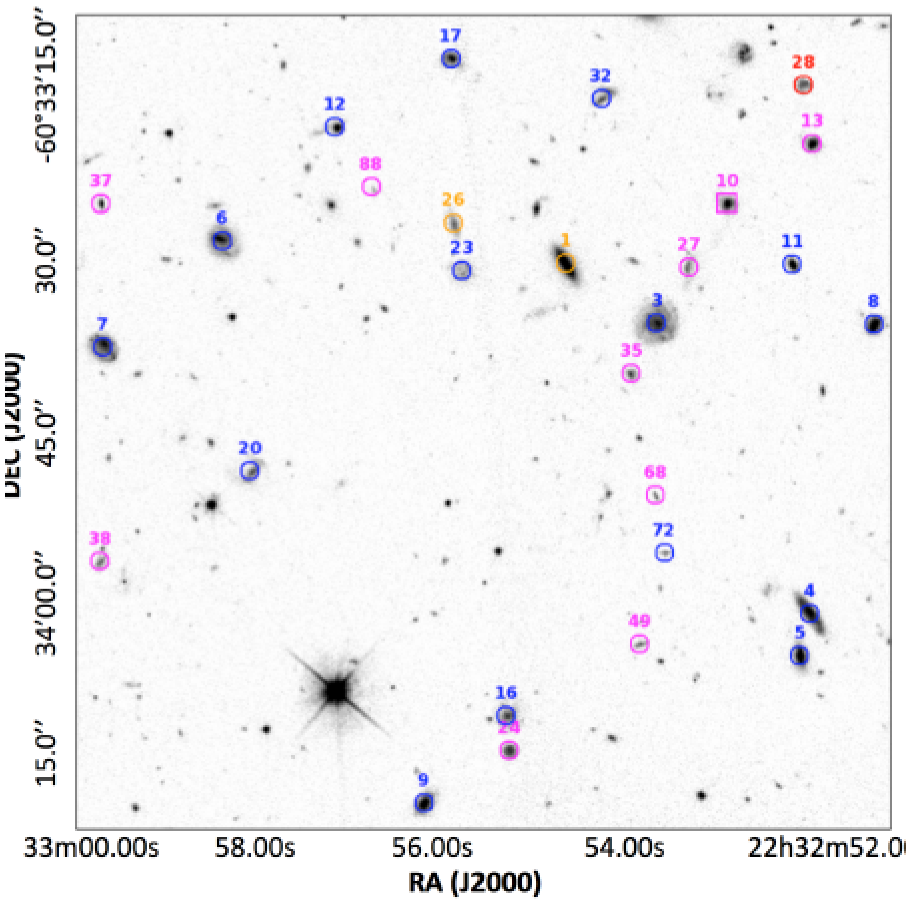
72% теплого газа ионизованно ([Si II]/O I])

Общий темп истечения (всех фаз): 0.4 Mo/yr

Deep MUSE observations in the HDFS
Morpho-kinematics of distant star-forming galaxies down to 10^8 M

T. Contini; 2, B. Epinat; N. Bouché et al.

arXiv:1512.00246v1



28 галактик с эмиссиями
Z=0.2-1.4 (parent sample 70)

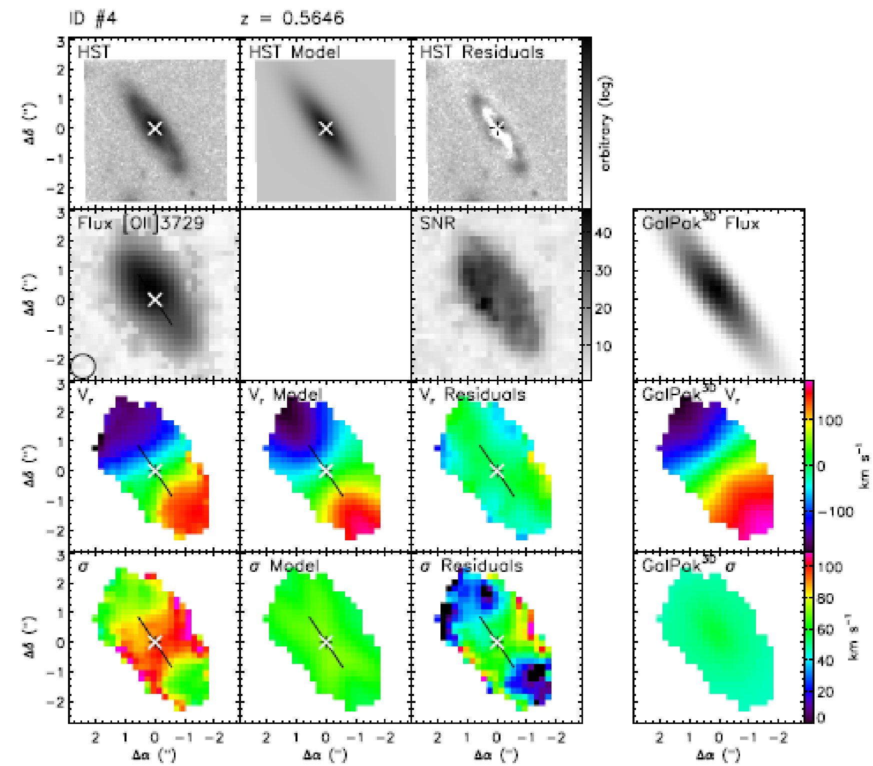


Fig. 5. Example of morpho-kinematic analysis for galaxy ID#4 at $z \approx 0.56$. Description is given from *left* to *right*. *Top* row: HST/WFPC2 F814W image, Galfit model (disk+bulge), and residuals, all in the same arbitrary log-scale units. *Second* row: MUSE [O II]λ3729 flux map (log scale) with the PSF FWHM size indicated with the black circle, corresponding SNR map (linear scale), and (deconvolved) modeled flux map (log scale) from GalPaK^{3D}. *Third* row: MUSE observed

Deep MUSE observations in the HDFS
Morpho-kinematics of distant star-forming galaxies down to 10^8 M

arXiv:1512.00246v1

2D vs 3D (instrinsic deconvolved) models

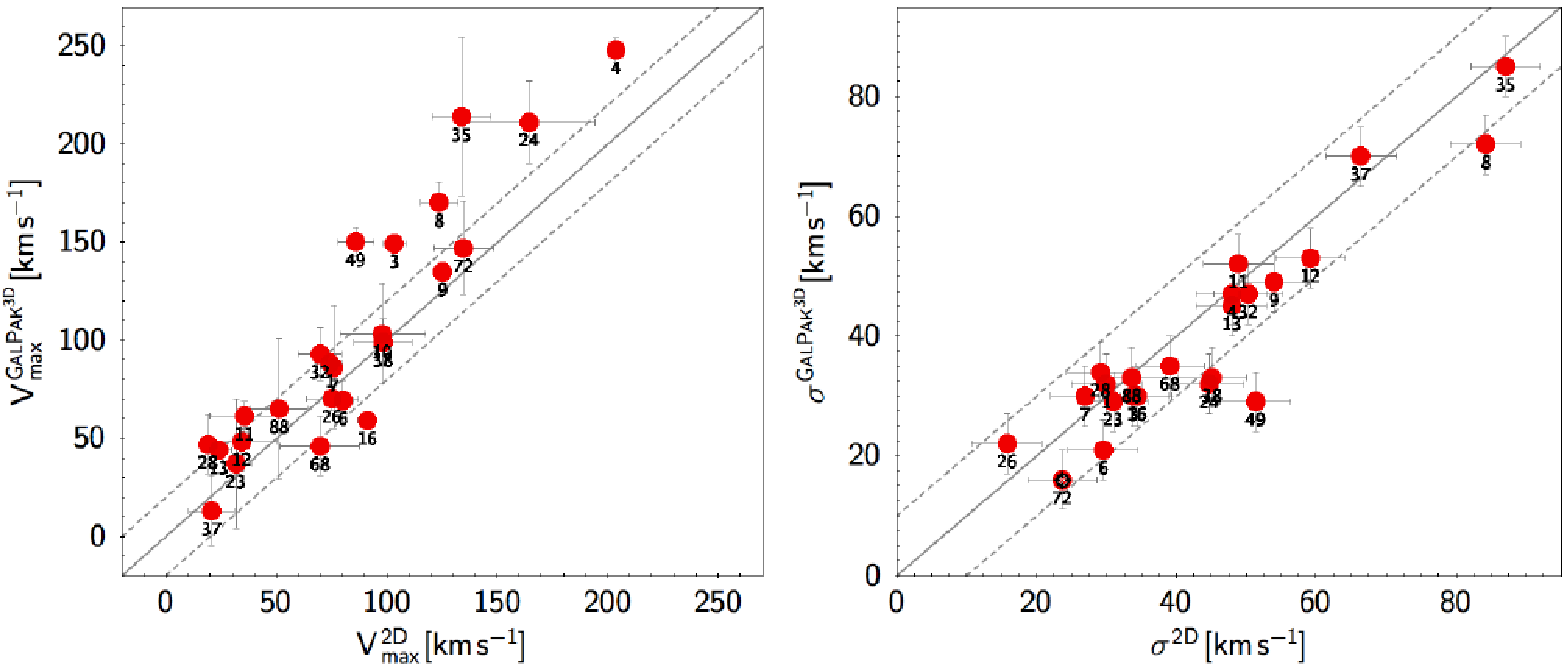


Fig. 7. Comparison of the values obtained by the 2D modeling to those obtained by GalPaK^{3D} for disk maximum rotational velocity (*left panel*) and velocity dispersion (*right panel*) for the spatially-resolved MUSE-HDFS galaxies (red points). Labels indicate the galaxy IDs. The solid line represents the 1:1 relation and the dashed lines indicate the typical scatter around this relation du to measurement uncertainties.

Deep MUSE observations in the HDFS
Morpho-kinematics of distant star-forming galaxies down to 10^8 M

arXiv:1512.00246v1

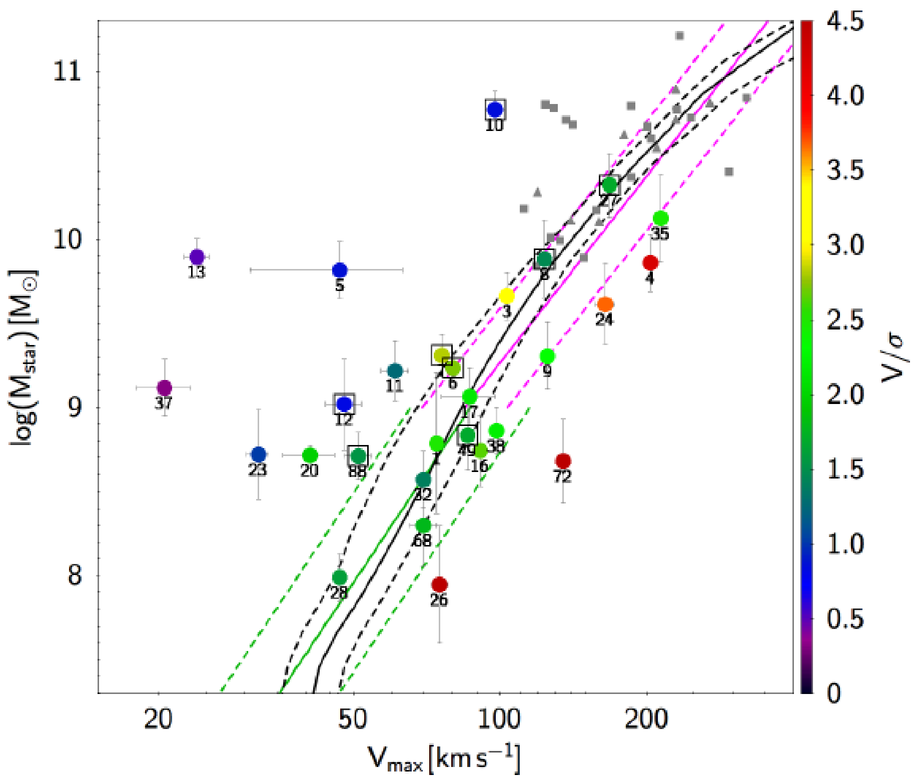


Fig. 10. Tully-Fisher relation for the sample of spatially-resolved galaxies in the MUSE-HDFS. Labels indicate the galaxy ID. The points are color-coded as a function of the V/σ ratio. Galaxies in close pairs and/or showing signatures of recent gravitational interactions are identified with black squares. Previous IFS samples of (massive) star-forming galaxies in similar redshift ranges: IMAGES (grey triangles, Puech et al.

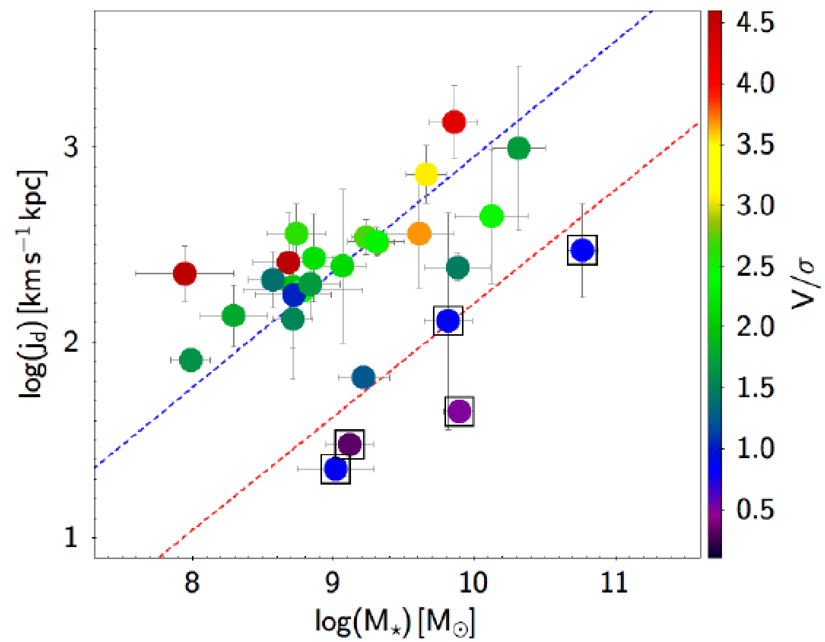


Fig. 12. The specific angular momentum of disks j_d as a function of galaxy stellar mass for the MUSE-HDFS sample of spatially-resolved galaxies. Data points are color-coded according to the V/σ ratio. Large squares indicate dispersion-dominated galaxies with $V/\sigma < 1$. The dashed lines show the relations defined for massive ($M_\star > 10^{10}$ M$_\odot$) galaxies at $z = 0$ (Fall & Romanowsky 2013), distinguishing between spheroids (red line) and disks (blue line).

Deep MUSE observations in the HDFS
Morpho-kinematics of distant star-forming galaxies down to 10^8 M

arXiv:1512.00246v1

Пока – без сенсаций:

Most of the MUSE-HDFS galaxies have gas kinematics consistent
with rotating disks. However, about 20% of these galaxies are dynamically dominated by random motions, as revealed by low (gaseous) V/σ ratios.

The rotation-dominated galaxies are more numerous and broadly follow the TFR defined so far in this lower masses/velocities regime using slit spectroscopy (Miller et al. 2014), but with a higher dispersion compared to more massive objects.

...90% of the MUSE-HDFS galaxies with stellar masses below $10^{9.5}$M are rotation-dominated and have thus already settled into a disk.