Euclid’s First Data Release Beside the Vacuum.Net Compression

Ten tests on public data: what holds, what is bounded and what remains to be unpacked

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Abstract

On 12 November 2026 the European Space Agency published the first data release of the Euclid space telescope. This essay lays that release beside the Vacuum.Net compression, which reads cosmology from one closed strand and one rule of closure. The aim is not to prove the compression. The aim is to see whether the new data can be written in its language, and where they ask it to be more precise. Ten tests were run on public data from Euclid, DESI and Galaxy Zoo. Three of them were fixed in writing before the data were seen. No unknown pattern was found. Four results carry weight. Redshift is smooth: no ladder is visible. Every period counts: the flux law carries the power 1.1 ± 0.1. The angle rule decides the sizes of galaxies. Without stretching of space they keep their size to z = 1.3. With expansion they shrink as 1/(1 + z). On a ruler that cannot grow, the path per scale step is nearly constant from z = 0.3 to 1.5. Beyond z = 2 it is 12 to 18 percent shorter. Two readings that only the compression invites gave no signal. They concern a redshift difference inside pairs of galaxies, and a shared spin sense of neighbouring spirals. Both now carry an upper bound. Two by-products matter to every user of the release: the purity of the spectroscopic catalogue, and a redshift bias for bright galaxies. The data do not choose between expansion and a closed strand. They do fix what the compression still has to deliver.

Keywords: Euclid DR1 · redshift · surface brightness · angular size · baryon acoustic oscillations · galaxy spin · pre-registration · Vacuum.Net compression

1. Introduction

On Thursday 12 November 2026 the European Space Agency released the first large data set of the Euclid space telescope [1, 4]. On the same day, Leiden astronomers presented it in a packed lecture hall [1]. The release holds the first thirteen months of the mission. It measures 1.7 million gigabytes and reveals some 900 million galaxies [1].

The speakers were clear about what is at stake. Alessandra Silvestri said that the history of the universe can be described remarkably well. She added that 95 percent of its content is still not understood. She also asked whether gravity itself is fully understood [1]. Koen Kuijken and Silvestri expect the first extended analyses in the summer of 2027 [1].

The data are public, and anyone can query them today. This essay does so with one purpose. On 8 November 2026 the essay “One Closed Strand” read cosmology through the Vacuum.Net compression [2, 3]. It closed with statements that astronomers can check, and with a list of what remains to be unpacked. Euclid’s release came four days later. It is the first new data set to be laid beside those statements.

The approach follows that essay. Three pictures of the whole stay open: the Big Bang, an eternal universe and a closed strand [2]. The compression is not a rival to physics. It is a compression of existing theory, and its measure is whether the data come back out of it [2, 3]. The question here is therefore modest. Can Euclid's first data be written in the language of the compression? And where do the data ask the compression to be more precise?

Each result is given first as a measurement. Then follows how standard cosmology reads it, and how the compression reads it. Where a test gave nothing, that is reported as plainly as where it gave something. No unknown pattern was found. What was found is firmer ground under four statements, and upper bounds on two wider readings. The result is a short list of numbers that the compression must now deliver.

2. The statements put to the data

The compression uses one closed strand and three values, −1, 0 and +1, that sum to zero [3]. Its one rule is closure: what closes persists, and what does not close passes on to the next scale. "One Closed Strand" applies the rule to cosmology in six steps [2]. Table 1 lists what could be tested with Euclid's first release, and what came out.

Five rows come from the cosmology essay itself. The last two rows are wider readings. They were added for this analysis as working assumptions, and the cosmology essay does not state them. They are included because standard cosmology would not ask for them.

Table 1. Statements, tests and outcomes. Section numbers refer to this essay.

Statement	Source	Test	Outcome
Redshift can take any value. There is no ladder.	Step 2 [2]	Search for periods in 3.3 million redshifts (4.1).	No ladder between steps of 600 and 9,000 km/s.
Every period of a source shifts by the same 1 + z.	Step 2 and Section 10 [2]	Flux law from supernovae and the acoustic ruler (4.2).	Holds. The power is 1.1 ± 0.1.
ln(1 + z) grows with the number of scale steps along the path.	Step 2 and Section 10 [2]	Acoustic ruler across and along the line of sight (4.4).	Holds as a count. The path per step is nearly constant from z = 0.3 to 1.5, and 12 to 18 percent shorter beyond z = 2.
The power of 1 + z in surface brightness is open.	Section 11 [2]	Flux law and sizes of galaxies (4.2, 4.3).	The power is 2 with the still-space angle rule. Galaxies then keep their size.
The web is the trit cube. Galaxies close as a meeting or as a ring.	Step 4 [2]	Form, rest and surroundings of 59,714 galaxies (4.5).	Rest follows the surroundings at every mass. Rest comes before form.
Working assumption: light from a deeper winding leaves redder, also in ordinary galaxies.	Section 9.2 [2] says this of the little red dots only	Pre-registered test on 22,532 close pairs (4.6).	No signal. Bound: 15 km/s per factor ten in surface density.
Working assumption: neighbouring spirals share their spin sense.	Theorem T11 [3], as read here	Pre-registered test and replication on 19,102 image cutouts (4.7).	No signal. At most 58 percent of true neighbours share it.

Four of the six checkable statements in the cosmology essay lie outside this release [2]. The little red dots need the James Webb telescope and X-ray data. The temperature of the background

radiation needs molecules in distant gas clouds. The acceleration scale $cH_0/2\pi$ needs rotation curves or lensing. The first release holds images, catalogues and spectra; lensing and clustering products follow in 2027 [4]. A map of the web in three dimensions, with resting galaxies in it, is also out of reach. Euclid’s spectrograph sees only galaxies with strong emission lines.

3. Data and method

3.1 Sources

All data are public. Four sources were used.

- **Euclid.** The mission and its instruments are described in [5]. The Euclid Science Archive was queried directly [27]. Used were the merged photometric catalogue, the morphology catalogue [6] and the photometric redshifts with physical parameters. Also used were the spectroscopic redshifts with line measurements [7], the single visits of the deep fields, and image cutouts.
- **DESI, the ruler.** Published distances from baryon acoustic oscillations in the second data release [9–12].
- **DESI, the control.** Redshifts from the first data release [15], reached through the Astro Data Lab [28].
- **Galaxy Zoo.** Volunteer labels for the spin sense of nearby spirals [25], taken from the SkyServer [29].

One published analysis was used as it stands: the comparison of supernova distances with ruler distances by Zhang and colleagues [13].

3.2 Samples

- Seven fields spread over the sky, four in the south and three in the north. Together they cover about 9.5 square degrees. They hold 544,390 objects brighter than magnitude 23.5 in the VIS band. After quality cuts, 261,854 galaxies remain.
- A sample of 4.0 million spectroscopic redshifts with a stated probability above 0.99.
- A southern strip with 1.3 million spectra, for the pair test.
- The northern deep field, where 32,517 Euclid spectra have a DESI counterpart.
- Image cutouts of face-on spirals: 3,641 in the seven fields, and 15,461 in a new region of about 150 square degrees.

The seven fields are half a percent of the release. They were chosen for their spread over the sky, before any result was known.

3.3 Rules of the analysis

- **Measurement before reading.** Each quantity is first reported as observed, without a distance model.
- **One rest wavelength.** Flux and radius of every galaxy were interpolated to a rest wavelength of 0.5 micron, between the bands VIS, Y, J and H. This works from $z = 0.44$ to 2.54. No colour correction from a model is then needed.
- **Readings side by side.** Sizes were computed for expansion, for the closed strand and for tired light, from the same angles.

- **Written down first.** The pair test and both spin tests were fixed in dated protocols before the data were fetched. Deviations are listed with the results.
- **Controls.** Sham pairs at different redshifts, a second instrument (DESI) and human labels (Galaxy Zoo) check the measurements themselves.
- **Errors.** Uncertainties come from resampling blocks of sky or fields, or from shuffling labels. They are one standard error unless stated.

A note on the method. Archive queries, computations and image measurements were carried out with Claude, an AI system made by Anthropic, under the author’s direction. The same holds for the draft of this text. All queries, scripts, protocols and a findings log are kept, so that every number can be recomputed.

4. Results

Ten tests were run. They are reported in eight sections; Sections 4.5 and 4.7 each hold two.

4.1 Redshift is smooth

Measurement. Euclid’s spectroscopic redshifts sit on a grid. The step is 0.0001 in ln(1 + z), which is 30 km/s. Between z = 0.84 and 1.88 the sample holds 3.66 million redshifts. They take only 4,480 distinct values. The grid is a choice of the processing software, not a property of the sky.

A ladder was searched for between z = 0.9 and 1.8, the range the spectrograph is built for. It holds 3.26 million redshifts. The count per grid step was compared with a smooth trend. No period between 0.0002 and 0.03 in ln(1 + z) stands out. The highest peak reaches 8.8 times the local background. A peak must reach 12.2 to have less than one percent chance of being noise. The highest peaks sit at 5 and 10 grid steps, which points to the processing. Nothing stands out at the Pythagorean comma, a period of 0.0136.

Sensitivity. Artificial ladders were added to the counts to see what the search can find. A ladder that modulates the counts by five percent is found at every period from 0.002 to 0.03. That is a step of 600 to 9,000 km/s. Finer ladders are erased by the scatter of the measurement, about 94 km/s. Coarser ones cannot be separated from large-scale structure. The catalogue is also impure (Section 4.8). If one in three redshifts is right, a real ladder must be about three times stronger to show.

Reading. Standard cosmology expects a smooth range. So does the compression. Its two ladders, ×2 and ×3, never meet, so their combinations lie dense on a logarithmic scale [2, 3]. Earlier claims of preferred redshifts did not survive large surveys [20]. Euclid now joins that record. The test supports the first statement of Table 1. It does not separate the readings.

4.2 Every period counts: the flux law

Statement. The cosmology essay says that every period of a source shifts by the same 1 + z [2]. Two periods matter for brightness. One is the oscillation of the light. The other is the interval between arrivals. If both are stretched, the received flux drops by two powers of 1 + z, on top of the distance. If only the oscillation is stretched, as in tired light, it drops by one.

Write the flux per unit of frequency as $F = L / (4\pi D^2 (1 + z)^k)$. Here D is the distance across the line of sight. Per unit of frequency, one power of 1 + z is taken up by the narrowing of the band. So k = 1 means that both periods count, and k = 0 is tired light.

Measurement. Supernovae give a distance from brightness. The acoustic ruler gives the distance D from an angle. Their ratio equals $(1 + z)^{(1 + k)/2}$. Zhang and colleagues compared the Pantheon+ supernovae with the DESI ruler, without assuming a history of expansion [13]. They write the same ratio as $(1 + z)^{1 + \varepsilon}$. Depending on method and prior they find ε between 0.02 and 0.09, each with an uncertainty of about 0.05. With a Planck prior the two methods give 0.047 and 0.070. In the notation used here k lies between 1.04 and 1.17, with an uncertainty of 0.1.

Reading. Both periods count. The second statement of Table 1 holds. Tired light lies about ten standard errors away, in line with older tests [16]. Standard cosmology knows the same result as the distance-duality relation, and it holds there as well. The measurement does not separate expansion from a closed strand. It separates both from tired light.

The open power. The result also fills an open item of the cosmology essay: the power of 1 + z in surface brightness [2]. Surface brightness is flux per unit of solid angle. With k = 1 the flux contributes two powers. The angle rule decides the rest. If the size of a galaxy is its angle times D, the solid angle adds nothing. The power is then 2. If the size is its angle times D / (1 + z), as in expansion, the solid angle adds two more. The power is then 4, the classic value of Tolman [16]. For tired light it is 1. All three values hold for light summed over all wavelengths. The measured k gives 2.1 ± 0.1 under the first rule. Whether that rule holds is a question about sizes.

4.3 The angle rule decides the sizes

Raw measurement. Measured at one rest wavelength, the median surface brightness of the sample barely changes with redshift. Its slope against log(1 + z) is +0.07. The median angular radius stays between 0.48 and 0.56 arcseconds from z = 0.44 to 1.5.

Three readings. An angle becomes a size through a distance and an angle rule. Three combinations were computed for all galaxies of a fixed luminosity. The cosmology essay gives no angle rule. For the closed strand the plain rule, size = angle × D, is assumed here. The size is written as $R \propto (1 + z)^x$.

- Expansion, with standard distances and size = angle × D / (1 + z): x = −1.35 ± 0.13.
- Closed strand, with $D \propto \ln(1 + z)$, k = 1 and size = angle × D: x = −0.34 ± 0.12.
- Tired light, with $D \propto \ln(1 + z)$, k = 0 and size = angle × D: x = +0.22 ± 0.09.

A subsample of 7,942 galaxies with confirmed redshifts gives −1.34, −0.37 and +0.04.

Where the difference sits. The distance law is not what separates the readings. With the distance of the acoustic ruler itself, the exponent is −1.32 under the expansion rule and −0.32 under the other. Across the line of sight, the log law and the ruler agree within three percent. The whole difference is one power of 1 + z, and it sits in the angle rule. For brevity the rule size = angle × D is called the still-space rule below.

Holding the population fixed. The first sample drifted with redshift. At fixed luminosity, the median stellar mass falls from $10^{11.1}$ to $10^{10.35}$ solar masses towards high redshift. The colour turns from red to blue. Nearby the sample holds galaxies at rest, and far away it holds active ones. The test was therefore repeated per kind (Table 2, Figure 1).

Reading. Under the still-space rule, galaxies keep their size from z = 0.5 to 1.3. Under the expansion rule they were smaller in the past, by about 1/(1 + z). Standard cosmology accepts the second and explains it as growth. Van der Wel and colleagues measured exponents of −0.75 for active galaxies and −1.48 for galaxies at rest, at fixed mass [19]. Lerner and colleagues saw the same pattern in other data and read it as the absence of expansion [17, 18]. Euclid's first release

repeats the pattern in one instrument, with bands matched in rest wavelength. The data do not choose. The choice of the angle rule fixes the outcome.

Table 2. Exponent x of the size, $R \propto (1 + z)^x$, with the population held fixed.

Selection	Still-space rule	Expansion rule
Active galaxies, fixed luminosity	−0.17 to −0.28	−1.17 to −1.28
Active disks, fixed luminosity	−0.13 to −0.26	−1.13 to −1.26
Active galaxies, fixed stellar mass	+0.08	−0.92
Galaxies at rest, fixed stellar mass	−0.10 to +0.04	−1.10 to −0.96
Summary	**0.0 ± 0.3**	**−1.0 ± 0.3**

Fixed stellar mass: $10^{10.8}$ to $10^{11.3}$ solar masses. Disks: Sérsic index below 1.5. Ranges span the luminosity windows and fitting choices that were tried.

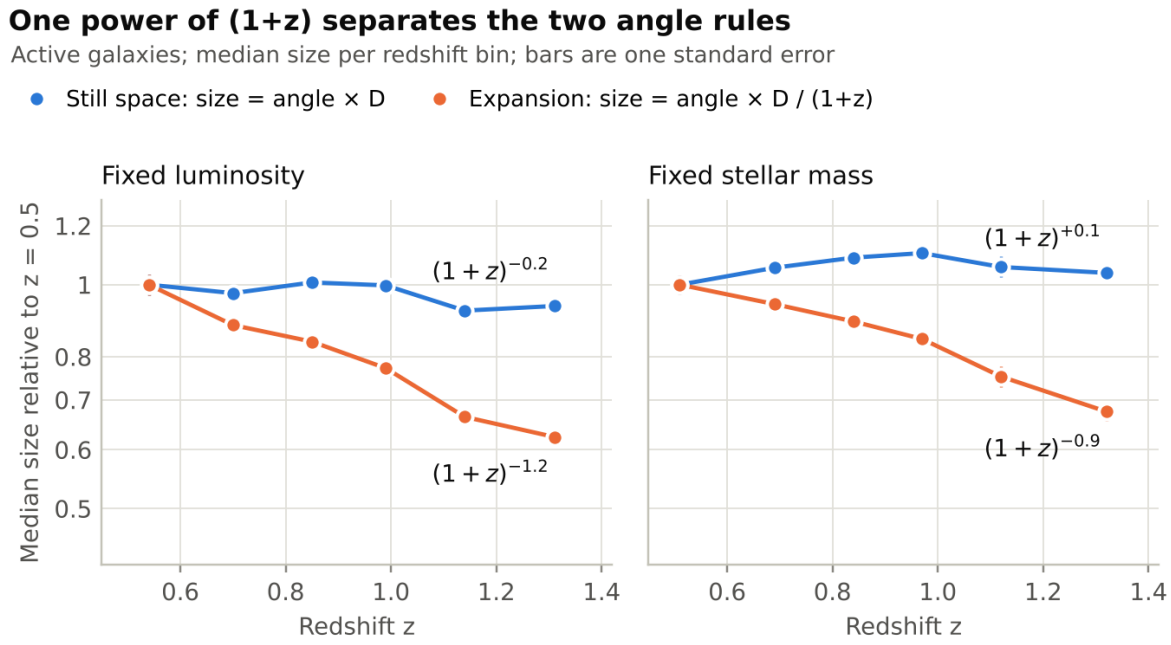


Figure 1. Median size of active galaxies against redshift, from the same angles under two angle rules. Left: fixed luminosity. Right: fixed stellar mass, $10^{10.8}$ to $10^{11.3}$ solar masses. Sizes are relative to the nearest bin.

A residue. At fixed luminosity a small slope remains under the still-space rule: x = −0.2 ± 0.1. A galaxy of the same luminosity is then about 13 percent smaller at z = 1. At fixed mass the slope is zero within the errors. The difference may reflect brighter stars at high redshift. It may also reflect the mass estimates, which lean on standard cosmology.

Limits of this test. Below $10^{10.8}$ solar masses the sample is incomplete at high redshift, so lower masses were left out. Galaxies at rest are incomplete above z = 1.2. The exponent also depends on which radius is used. With k left free, constant sizes ask for k = 0.55 ± 0.15, with a systematic range from 0.1 to 1.4. That agrees with k = 1 only within the systematic range.

4.4 The ruler: how long is a scale step?

The ruler. The acoustic scale is a fixed length, printed in the distribution of galaxies. Unlike a galaxy, it cannot grow. DESI measures it in two directions [9–12]. Across the line of sight it gives

the distance D. Along the line of sight it gives a second number, D_H. Both are in units of the ruler itself, so no Hubble constant is needed.

Two columns. The third statement of Table 1 ties ln(1 + z) to a count of scale steps along the path. In its simplest form every step takes the same length of path. Then D = A ln(1 + z), with one constant A. Two quantities must then show that same constant. The first is D / ln(1 + z), the mean path per step up to z. The second is $D_H \times (1 + z)$, the local path per step at z. Table 3 gives both.

Table 3. The acoustic ruler read as scale steps, in units of the ruler. The plateau is the weighted mean of the local step between z = 0.5 and 1.5: 33.44 ± 0.24. Values computed from DESI [9, 11, 12].

Tracer	z	Mean step to z $D / \ln(1 + z)$	Local step at z $D_H \times (1 + z)$	Local step against plateau
Luminous red galaxies	0.510	32.97 ± 0.41	33.01 ± 0.64	−1.3%
Luminous red galaxies	0.706	32.48 ± 0.33	33.19 ± 0.56	−0.7%
Red and emission-line galaxies	0.934	32.71 ± 0.23	34.12 ± 0.37	+2.0%
Emission-line galaxies	1.321	32.78 ± 0.38	32.90 ± 0.51	−1.6%
Quasars	1.484	33.53 ± 0.84	31.84 ± 1.28	−4.8%
Lyman-alpha forest, bin 1	2.13	32.61 ± 0.72	29.42 ± 0.63	−12.0%
Lyman-alpha forest, all	2.33	32.41 ± 0.44	28.74 ± 0.34	−14.0%
Lyman-alpha forest, all, full shape	2.33	32.69 ± 0.27	28.64 ± 0.22	−14.4%
Lyman-alpha forest, bin 2	2.40	33.21 ± 0.81	28.15 ± 0.58	−15.8%
Lyman-alpha forest, bin 3	2.81	30.36 ± 0.76	27.51 ± 0.65	−17.7%

The three Lyman-alpha bins divide the same data as the rows marked "all". They are not independent of them.

Outcome. Five points follow from the table.

- Across the line of sight, the distance follows ln(1 + z) within two percent from z = 0.5 to 2.4.
- Along the line of sight, the local step is constant from z = 0.5 to 1.5, within the errors. Its weighted mean is 33.44 ± 0.24.
- Beyond z = 2 the local step is shorter: by 12 percent at z = 2.13, 14 at 2.33, 16 at 2.40 and 18 at 2.81. The point at z = 2.33 lies 11 standard errors below the plateau.
- Nearer than z = 0.5 the step is slightly shorter too. The nearest DESI sample, at z = 0.3, has one combined measurement. Read with equal steps it gives 32.04 ± 0.30, four percent below the plateau.
- Equal steps, with one free number, fit all DESI points with $\chi^2 = 193.6$ for 12 degrees of freedom. Below z = 1.5 they give 21.6 for 10. The standard shape, with two free numbers, gives 10.5 for 11 on all points.

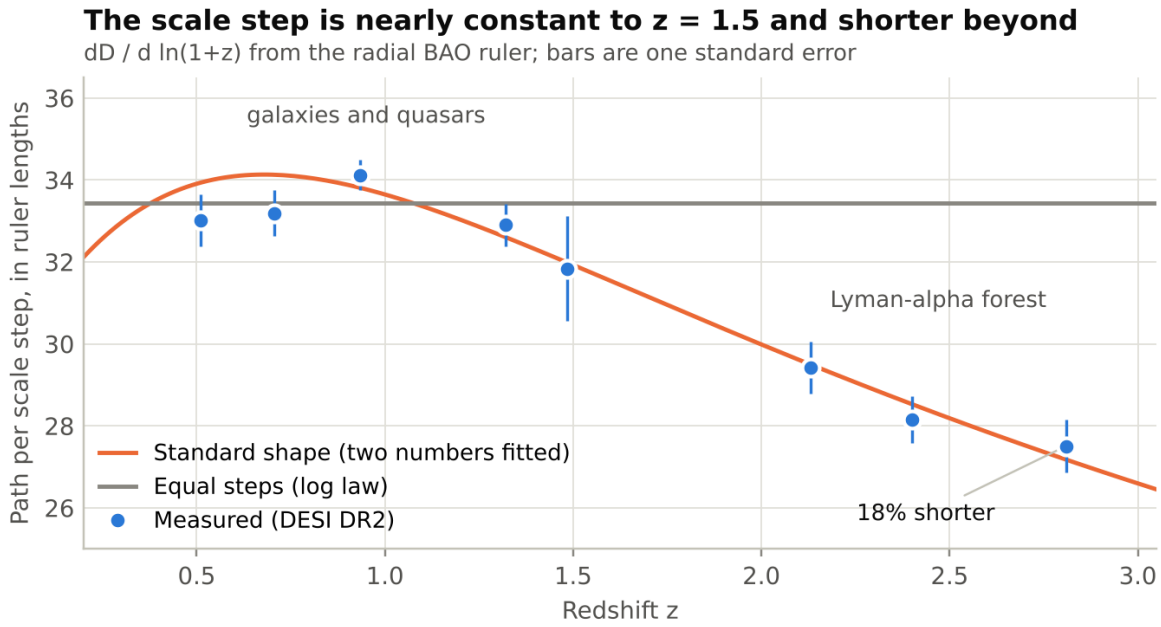


Figure 2. The local path per scale step from the radial acoustic ruler. Blue: DESI measurements [9, 11]. Grey: equal steps, at the plateau of 33.44. Orange: the shape of the standard model, with two fitted numbers.

Reading. Equal steps describe the ruler within a few percent between z = 0.3 and 1.5. They are not exact there, and they fail beyond z = 2. This does not depend on the length of the ruler. At z = 2.33 the ratio of the two directions is 4.52 ± 0.10, against 4.01 for equal steps.

In the standard model the same curve is the history of expansion. The step is longest near z = 0.7, where acceleration nearby gives way to deceleration far away. Beyond z = 2 the DESI authors find that the expansion rate grows as $(1 + z)^n$, with n = 1.34 ± 0.16 [11]. Equal steps would need n = 1. The log law itself is not new. It is the distance law of a universe that coasts, such as the $R_h = ct$ model [14]. That model is contested, and the deep DESI points weigh against it too.

For the compression this is a number to unpack. The count of scale steps still orders the data, as the third statement asks. But a step does not take the same length of path at every depth. The path per step peaks near z = 0.7. It is 4 percent shorter at z = 0.3 and 18 percent shorter at z = 2.8. The standard model delivers this curve from two fitted numbers. The compression has to deliver it from its closure depths.

4.5 Rest comes before form

Forms. For 16,022 bright galaxies the catalogue gives a visual class [6]. Their median redshift is 0.33. Of these, 38.3 percent are smooth and 61.7 percent show a disk or features. Among 6,802 face-on spirals the number of arms could be set for 70 percent. Of those, 83 percent have two arms. The winding is tight in 65.5 percent, medium in 23.7 and loose in 10.8.

Rest and surroundings. For 59,714 galaxies between z = 0.3 and 0.8 the local density was measured from the fifth neighbour, in a slice of photometric redshift. A galaxy counts as at rest when its colours show no star formation. At every stellar mass, denser surroundings hold more galaxies at rest (Figure 3). At $10^{9.5}$ to 10^{10} solar masses the share rises from 9 to 33 percent. At $10^{10.8}$ to $10^{11.5}$ it rises from 84 to 94 percent.

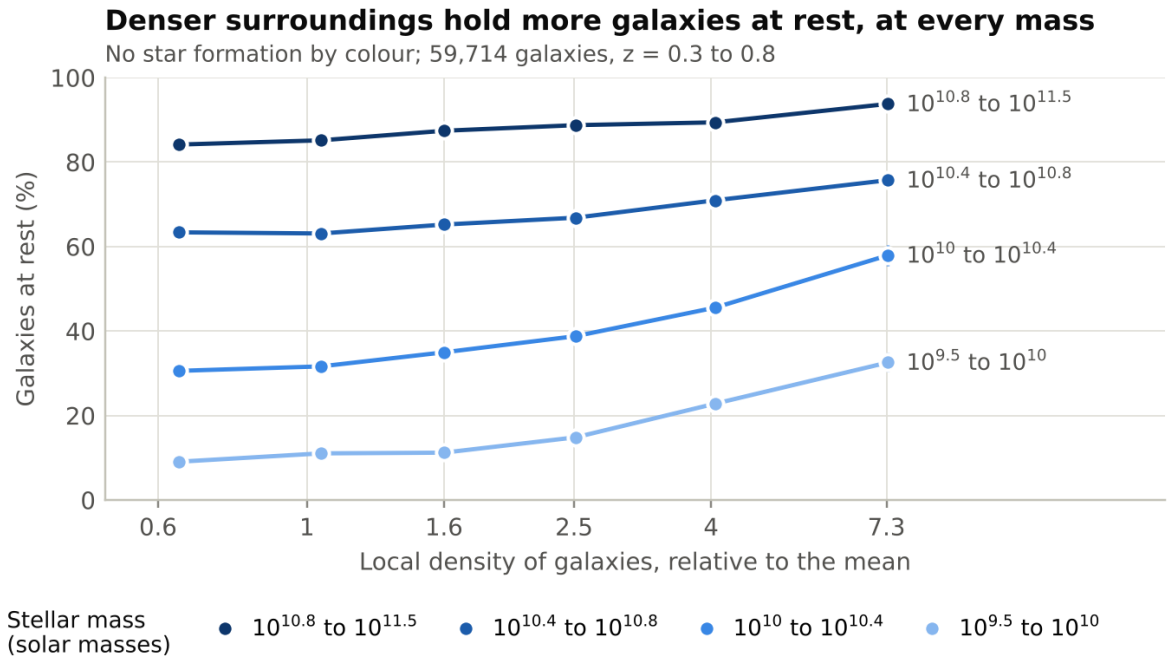


Figure 3. Share of galaxies at rest against local density, in four bins of stellar mass. Uncertainties are 0.4 to 2.4 percentage points.

Rest before form. Take the mass bin from $10^{10.4}$ to $10^{10.8}$ solar masses. Of the galaxies at rest, 66.7 percent are smooth. Of the active ones, 8.9 percent are. But disks come to rest as well, and more so in dense places. In the emptiest surroundings 16.0 percent of the disks are at rest; in the densest, 24.3 percent. For smooth galaxies the shares are 88.5 and 94.7 percent. Rest follows the surroundings. Form follows later, or not at all.

Reading. The pattern is known. Dressler found smooth galaxies in dense places [22]. Peng and colleagues showed that mass and surroundings act separately on star formation [23]. For the compression the pattern suggests a sharpening. The cosmology essay reads the web as the trit cube, and the form of a galaxy as its own closure: meeting or ring [2]. The data add a second property, rest, which follows the cell and not the galaxy. One reading fits. A cell that closes passes nothing on, so what lies in it comes to rest. The form is the galaxy’s own closure, one scale lower. This is a proposal, not a result.

No preferred direction. The long axes of 58,889 resolved galaxies show no preferred direction in any field. Neighbours at the same redshift are not aligned at separations from 5 to 300 arcseconds.

4.6 The local rule: a test on pairs

Statement. Section 9.2 of the cosmology essay says that light from a deep winding passes many closed layers and leaves redder [2]. It says so of the little red dots. As a working assumption, the rule was extended here to ordinary galaxies. In a physical pair, the deeper member should then show the higher redshift. Depth was taken as surface density: flux in the H band per unit of area inside the half-light radius. The protocol was fixed on 14 November 2026 at 18:35 UTC, before the data were fetched.

Data. A southern strip gives 1,195,111 spectra after quality cuts. They form 1,075,446 pairs at separations of 3 to 20 arcseconds. Of these, 22,532 differ by less than 500 km/s. About 55 percent of those are physical pairs. Errors come from resampling 184 blocks of sky.

Table 4. Redshift of the deeper member minus that of the shallower member, in close pairs.

Measure	Pairs	Difference
Primary: surface density differs by a factor two or more	15,362	+3.9 ± 2.0 km/s
Brightness in the H band differs by a factor two or more	12,170	+11.9 ± 2.2 km/s
More compact member, at equal brightness	3,523	+1.0 ± 4.4 km/s
Member seen more edge-on	7,455	−4.4 ± 2.6 km/s
Sham pairs at different redshifts, ordered by surface density	22,873	−22.6 ± 16.4 km/s

Outcome. The primary measure gives +3.9 ± 2.0 km/s. The protocol asked for three standard errors. That is no signal. One secondary measure does stand out. The brighter member is redder by 11.9 ± 2.2 km/s. Sham pairs come out slightly negative, as expected. Of two unrelated galaxies on one line of sight, the nearer one is on average the brighter.

Control with a second instrument. DESI measured part of Euclid’s galaxies with other lines and a much higher resolution [15]. A property of the light would sit in both measurements and cancel in their difference. An error of Euclid’s measurement would remain. Figure 4 shows the difference for 7,802 galaxies. For galaxies fainter than magnitude 21.2 in H it stays within 8 km/s of zero. For brighter galaxies it is +18 to +50 km/s. The slope is +34.1 ± 6.2 km/s per factor ten in flux. Against surface density there is no slope: −3.3 ± 3.3.

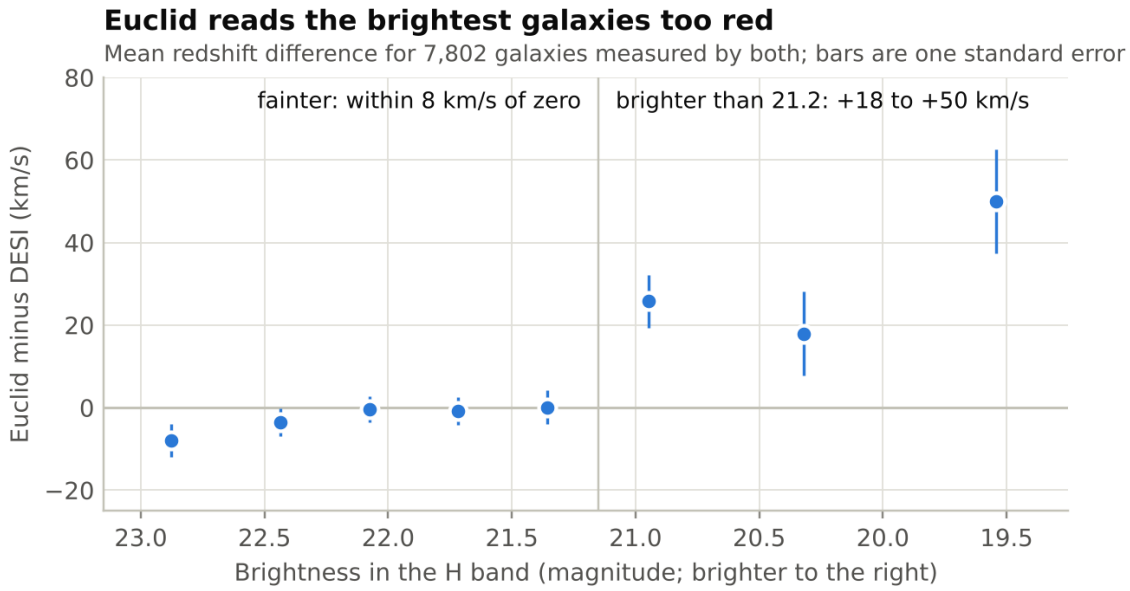


Figure 4. Redshift measured by Euclid minus redshift measured by DESI, against brightness, for 7,802 galaxies between z = 0.9 and 1.8.

The secondary signal is therefore an effect of the measurement. Applied to the pairs, the measured bias predicts +20.2 ± 3.5 km/s for brightness and +7.7 ± 1.3 km/s for surface density. Observed were +11.9 and +3.9. The remainders are −8.3 ± 4.2 and −3.8 ± 2.4 km/s. Both are zero within two standard errors.

The probable cause is known. Euclid’s grism does not separate the Hα line from two nitrogen lines beside it. The stronger nitrogen line lies on the red side. Massive galaxies hold more nitrogen, so their blend shifts red.

Bound. For ordinary galaxies the local rule is not visible. Any such effect is below about 15 km/s per factor ten in surface density. That is 5 parts in 100,000. Standard physics has a local rule of its own: light that climbs out of a deep gravitational well arrives redder. It has been measured in clusters of galaxies at about ten km/s [21]. For single galaxies it is far smaller. The bound found here does not reach it.

Deviations from the protocol. Three are to be noted. The control used the single visits of the northern deep field, because DESI does not cover the southern strip. The prediction of the pair signal from the bias was not in the protocol. And the bias was measured on DESI targets in the north, then applied to all galaxies in the south.

4.7 The spin sense of neighbouring spirals

Statement. In the compression a spiral galaxy is a ring closure, with winding number +1 or −1 [2]. Theorem T11 says that only a seam between equal windows is free of tension [3]. As a working assumption this was read as follows: neighbouring spirals share their spin sense more often than chance allows. The cosmology essay does not state this. An earlier study with Galaxy Zoo found a hint of it below half a megaparsec, at two to three standard errors [24].

Measure. Euclid’s archive serves image cutouts. Each cutout was corrected for inclination and mapped to the plane of ln r and angle. A spiral arm is a slanted stripe there, and the sign of the slant gives the spin sense [26]. The measure H runs from −1 to +1. A galaxy counts only when its inner and outer half give the same sign.

Calibration. The measure was checked before any pair was counted. Mirroring an image flips H exactly. Of 200 synthetic spirals, 200 came out right. Galaxy Zoo volunteers supplied the human reference [25]. For 140 galaxies with a clear vote, shrunk to the size of the Euclid sample, the measure agrees in 90.0 percent. It agrees in 98.3 percent when inner and outer half concur. The sky shows no preference: 50.9 ± 0.8 percent of the galaxies turn one way. A blind check by eye on Euclid cutouts scored 8 out of 16. That is chance, so the eye was replaced by the volunteer labels.

First test. The protocol was fixed before any image was fetched. The seven fields give 3,641 cutouts and 2,482 galaxies with a firm spin sense. The primary measure counts pairs at the same photometric redshift within one megaparsec. It finds 609 pairs with equal spin and 610 with opposite spin. The excess E is the number of equal pairs minus the number of opposite pairs, divided by all pairs. Here $E = -0.001 \pm 0.029$. Within 300 kiloparsec the count is 75 against 57, or $E = +0.136 \pm 0.085$. That is 1.6 standard errors, and it was seen after the fact. It counts as a hypothesis, not as a result.

Replication. The hypothesis was tested on new sky: about 150 square degrees with 58,856 face-on spirals. The protocol was fixed at 20:10 UTC on the same day. The measuring code was frozen and its checksum recorded. Of 15,461 cutouts, 10,533 gave a firm spin sense. Within 300 kiloparsec, 1,079 pairs have equal spin and 1,123 opposite spin. $E = -0.020 \pm 0.022$. Within 150 kiloparsec the count is 295 against 306. Sham pairs give $+0.012 \pm 0.022$. The hint is not confirmed (Figure 5).

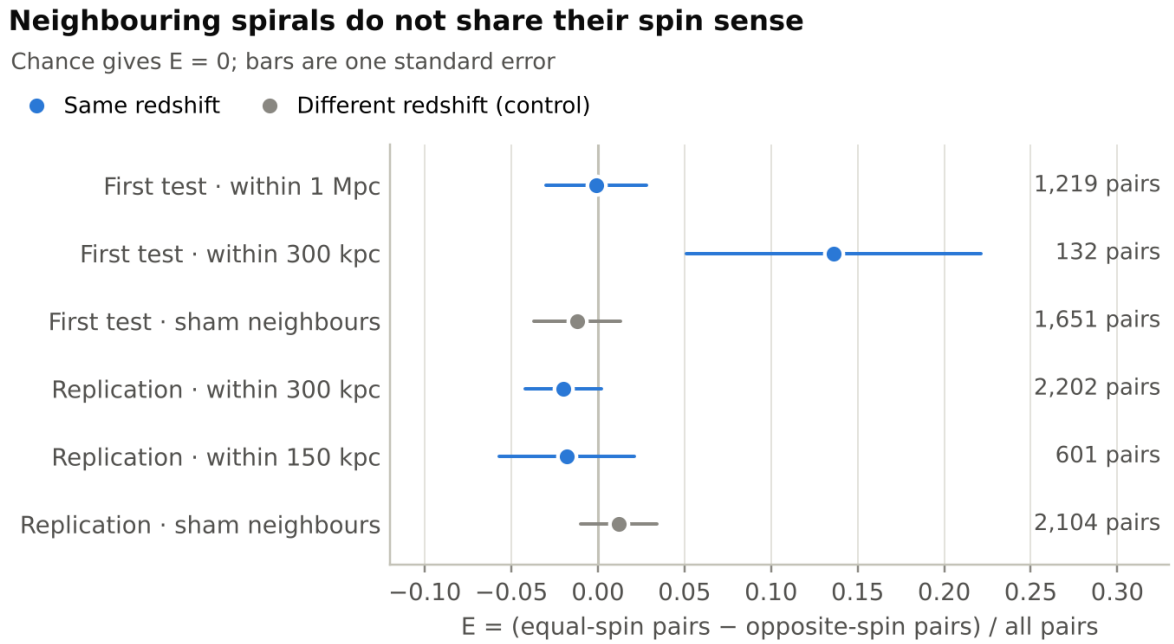


Figure 5. Excess of equal-spin pairs among neighbouring spirals. Blue: pairs at the same photometric redshift. Grey: sham neighbours at different redshifts.

How sharp is the test? Not very. Photometric redshifts admit many chance neighbours. Against shuffled redshifts, only 15 percent of the close pairs are physically connected. A real effect is diluted more than six times. Among true neighbours the result is $E = -0.14 \pm 0.15$. The one-sided upper bound, at two standard errors, is about 0.15. At most 58 percent of true neighbours share their spin sense, against 50 percent by chance. This dilution should have been computed before the replication was proposed. The test could only see a strong coherence.

Reading. Standard models of galaxy formation expect at most a weak coupling of spins between close neighbours [24]. The data fit no coupling, and they fit a weak one. The reading of T11 as a shared spin sense finds no support at this level. Either the theorem does not carry over to neighbouring galaxies, or the effect is smaller than the bound.

4.8 Two by-products for users of the release

Purity of the spectroscopic redshifts. Table 5 compares Euclid’s spectroscopic redshifts with two references. The first is the photometric redshift of the same bright galaxies in the seven fields. The second is DESI in the northern deep field. Without further selection, one in three redshifts is right. The two references agree on that. With the reliability flag of the catalogue the share rises to between 66 and 81 percent.

The misses are mostly nearby galaxies. Their lines of sulphur, helium or the Paschen series are read as Hα, which moves them into the range from 0.9 to 1.8. The pipeline prefers Hα by design, and the Euclid team reports 89 percent success with a tuned selection [7]. Overlapping spectra add to the problem [8]. The bright samples used here are rich in nearby galaxies, so they show the effect at its strongest. Galaxies that really lie between $z = 0.9$ and 1.8 are measured right in 71 percent of the cases. These are DESI targets, not a random sample.

Table 5. Share of Euclid spectroscopic redshifts, with a stated probability above 0.99, that agree with a reference. Agreement means within 0.1 × (1 + z) for photometric redshifts and within 1,000 km/s for DESI.

Selection	Reference	Galaxies	Agree
All	Photometric redshift	38,066	34%
Reliability above 0.5	Photometric redshift	5,770	66%
Euclid redshift 0.9 to 1.8	DESI	25,852	32%
Same, reliability above 0.5	DESI	5,070	71%
Same, reliability above 0.7	DESI	1,884	81%
DESI redshift 0.9 to 1.8	DESI	11,598	71%

A redshift bias for bright galaxies. Galaxies brighter than magnitude 21.2 in H are measured 18 to 50 km/s too red (Section 4.6, Figure 4). The mean over all matched galaxies is only +4.3 ± 1.7 km/s. That agrees with the small mean bias reported by the Euclid team [7]. The dependence on brightness matters for work on pairs, groups and clusters. It is larger than the gravitational redshift that such work may look for [21].

5. What the results mean for the compression

The data can be written in the language of the compression. They also ask it to be more precise in three places, and more restrained in two.

5.1 Three sharpenings

1. **State the angle rule.** Step 2 of the cosmology essay gives the ratio 1 + z and its logarithm [2]. It does not yet say how an angle becomes a size. The data show that this choice carries one full power of 1 + z. With the still-space rule, galaxies keep their size, and the open power in surface brightness becomes 2. The rule belongs in the text of Step 2.
2. **Give the path per scale step.** The third statement ties ln(1 + z) to a count of steps. It does not say how much path a step takes. The ruler now does. The path per step peaks near z = 0.7 and is 18 percent shorter at z = 2.8. This curve is the first number that the compression has to deliver for cosmology.
3. **Separate rest from form.** Step 4 reads form as the galaxy’s own closure. The data show a second property, rest, that follows the surroundings and comes before form. A reading in which a closed cell brings its content to rest would cover both. It still has to be derived.

5.2 Two restraints

- The local rule of Section 9.2 stays with the little red dots. For ordinary galaxies any such effect is below 15 km/s per factor ten in surface density.
- Theorem T11 does not show up as a shared spin sense of neighbouring galaxies. At most 58 percent of true neighbours share it.

5.3 What the data do not do

The data do not choose between the pictures. Each reading keeps one debt. In the expansion reading, galaxies of a given kind must grow almost exactly as 1 + z. The standard picture measures and models that growth [19]. Critics find the match too neat [18]. In the closed-strand reading, galaxies keep their size, and the debt moves to the ruler. The curve of Figure 2 must then

come out of the closure depths. The numbers are the same in both readings. Their meaning differs.

6. Limits

- **Small area.** The tests on size and rest use 9.5 square degrees, half a percent of the release.
- **Inputs that carry a model.** Stellar masses are computed with standard distances and ages. Photometric redshifts rest on templates. Luminosities and angles are closer to the observation.
- **Selection.** The samples are limited by flux. Below $10^{10.8}$ solar masses they are incomplete beyond z = 1.
- **Impure spectroscopy.** Wrong line identifications weaken the search for a ladder and the pair test.
- **Diluted pairs.** Photometric redshifts turn most close pairs into chance alignments. The spin test could see only a strong effect.
- **A borrowed ruler.** The ruler distances are published values. Their analysis starts from a standard model, although the outcome depends little on it.
- **One day, one analysis.** All tests were run on 14 November 2026, two days after the release. Nobody else has repeated them yet.
- **Nothing new in the sky.** Every pattern in the sky that is reported here is known from other surveys. New is that the patterns stand in Euclid’s first release, and what they ask of the compression. The two by-products concern the instrument, not the sky.

7. Conclusion

Euclid’s first release can be written in the language of the Vacuum.Net compression. Redshift is smooth. Every period shifts by the same 1 + z. The count of scale steps orders the distances, and the ruler now shows how much path a step takes at each depth. The open power in surface brightness becomes 2 once the still-space angle rule is adopted. Galaxies then keep their size.

Two wider readings gave nothing. A local redshift in ordinary galaxies and a shared spin sense of neighbours are now bounded from above. That narrows what the compression may claim.

The data do not decide between the Big Bang, an eternal universe and a closed strand. Only tired light, one variant of the second picture, is excluded. What the data change is the list of what remains to be unpacked. One item can be filled in: the power in surface brightness. One item is added: the path per scale step as a function of depth.

The next data are dated.

- Sizes in Euclid’s deep fields to z = 2.5, with samples that are complete in mass.
- Supernovae nearer than z = 0.3, as a test of the path per step where the ruler has one point.
- The spin test on the whole release, about 200,000 cutouts, or on pairs with spectroscopic redshifts.
- The full first release in 2027, with lensing and clustering [4]. It opens the acceleration scale and the web in three dimensions.

Data and code

All data are public [27–29]. The queries, the scripts, the three dated protocols and the findings log are kept by the author. They are available on request.

Cite as: Konstapel, J. (2026). *Euclid's First Data Release Beside the Vacuum.Net Compression.* Constable Research, Leiden, 14 November 2026.

Annotated references

The list is ordered by theme. Each entry says what the source is used for, and where a reader can continue.

The occasion and the compression

[1] Fockens, J. (2026). "Leidse sterrenkundigen presenteren grootste kaart heelal ooit." *Sleutelstad*, Leiden, 14 November 2026.
The occasion of this essay. Reports the Leiden presentation of the release, its size, and what Silvestri, Kuijken and Cañas Herrera expect from it.

[2] Konstapel, J. (2026). "One Closed Strand: Cosmology Read Through the Vacuum.Net Compression." Constable Research, Leiden, 8 November 2026. constable.blog/2026/11/08/red-dots
The cosmology essay that is laid beside the data here. Used are Step 2 (redshift), Step 4 (web and galaxies), Section 9.2 (the local rule), Section 10 (checkable statements) and Section 11 (open items).

[3] Konstapel, J. (2026). *The Vacuum.Net Theory, Ninth Edition: Foundations 9.2 and Physics 9.0.* Constable Research, Leiden.
The formal statement of the compression. Theorem T11, used in Section 4.7, is numbered as in this edition.

Euclid and its first release

[4] European Space Agency (2026). Euclid Data Release 1 (DR1): release page and timeline. ESA Cosmos portal. cosmos.esa.int/web/euclid/data-release-dr1; cosmos.esa.int/web/euclid/dr1-timeline
The official description of the release. Start here for what the foundation release contains and for what follows in 2027.

[5] Euclid Collaboration: Mellier, Y., et al. (2025). "Euclid. I. Overview of the Euclid mission." *Astronomy & Astrophysics* 697, A1.
Mission, instruments and survey design. Explains the visible imager (VIS) and the near-infrared spectrometer that produced the Euclid data used here.

[6] Euclid Collaboration: Walmsley, M., et al. (2025). "Euclid Quick Data Release (Q1). First visual morphology catalogue." *Astronomy & Astrophysics*. arXiv:2503.15310. doi:10.1051/0004-6361/202555140
How the visual classes (smooth, featured, number of arms, winding) are predicted from volunteer votes by the Zoobot model. Basis of Sections 4.5 and 4.7.

[7] Euclid Collaboration: Le Brun, V., et al. (2026). "Euclid Quick Data Release (Q1). Characteristics and limitations of the spectroscopic measurements." *Astronomy & Astrophysics* 711, A7. arXiv:2503.15308
The spectroscopic pipeline and its limits. Reports an 89 percent success rate with a tuned selection, and a small mean bias against DESI. Read it beside Section 4.8.

[8] Euclid Collaboration: Passalacqua, F., et al. (2026). "Euclid preparation. First investigation of the impact of cross-contamination on spectroscopic redshift measurements with pixel-level simulations." arXiv:2606.24697
Simulations of overlapping spectra in slitless spectroscopy. Background to wrong redshifts in crowded fields.

DESI: the ruler, the candle and the control

[9] DESI Collaboration (2025). "DESI DR2 Results II: Measurements of Baryon Acoustic Oscillations and Cosmological Constraints." *Physical Review D* 112. arXiv:2503.14738. doi:10.1103/tr6y-kpc6
The ruler of Section 4.4. Its Table IV gives the distance across and along the line of sight, with their correlations, in seven redshift bins.

[10] DESI Collaboration (2025). "DESI DR2 Results I: Baryon Acoustic Oscillations from the Lyman Alpha Forest." *Physical Review D* 112, 083514. arXiv:2503.14739
The deepest point of the ruler, at z = 2.33, measured in the absorption of quasar light by hydrogen.

[11] Herrera-Alcantar, H. K., Guy, J., Gonzalez-Morales, A. X., et al. (2026). "Probing the matter-dominated expansion with multi-redshift Lyman-α BAO from DESI DR2." arXiv:2607.19619
Splits the deepest sample into three bins, at z = 2.13, 2.40 and 2.81. Source of the growth exponent n = 1.34 ± 0.16 quoted in Section 4.4.

[12] DESI Collaboration (2026). "DESI DR2 Results IV: Alcock-Paczynski Measurements from the Lyman Alpha Forest and Cosmological Constraints." arXiv:2607.27410
Sharpens the point at z = 2.33 with the full shape of the correlations. Gives the most precise local step in Table 3.

[13] Zhang, X., Yang, X., Ren, Y., Chen, S., Shi, Y., Cheng, C., Zhang, M., & He, X. (2026). "Testing Cosmic Distance Duality Relation and Transparency with DESI DR2." *Journal of Cosmology and Astroparticle Physics* 2026(06), 012. arXiv:2506.17926
Compares supernova distances with ruler distances without assuming a history of expansion. Its Table 3 gives the exponent ε behind the flux law of Section 4.2.

[14] Melia, F., & Shevchuk, A. S. H. (2012). "The R_h = ct universe." *Monthly Notices of the Royal Astronomical Society* 419, 2579–2586. doi:10.1111/j.1365-2966.2011.19906.x
A coasting universe with the same logarithmic distance law as equal scale steps. Contested in the literature. It is the nearest relative of the log law in standard language.

[15] DESI Collaboration (2025). "Data Release 1 of the Dark Energy Spectroscopic Instrument." arXiv:2503.14745
The independent redshifts that serve as a control in Sections 4.6 and 4.8.

Sizes and surface brightness

[16] Lubin, L. M., & Sandage, A. (2001). "The Tolman Surface Brightness Test for the Reality of the Expansion. IV. A Measurement of the Tolman Signal and the Luminosity Evolution of Early-Type Galaxies." *The Astronomical Journal* 122, 1084–1103. doi:10.1086/322134
The classic reading of the surface-brightness test in favour of expansion, with galaxies that fade over time. Also rejects tired light.

[17] Lerner, E. J., Falomo, R., & Scarpa, R. (2014). "UV surface brightness of galaxies from the local Universe to z ~ 5." *International Journal of Modern Physics D* 23(6), 1450058. arXiv:1405.0275
The opposite reading: surface brightness that stays constant in a geometry without expansion. The pattern of Section 4.3 was reported here first.

[18] Lerner, E. J. (2018). "Observations contradict galaxy size and surface brightness predictions that are based on the expanding universe hypothesis." *Monthly Notices of the Royal Astronomical Society* 477, 3185–3196.
Argues that the growth of galaxies needed by expansion mirrors the expansion factor itself. Section 4.3 finds the same match in Euclid.

[19] van der Wel, A., et al. (2014). "3D-HST+CANDELS: The Evolution of the Galaxy Size–Mass Distribution since z = 3." *The Astrophysical Journal* 788, 28.
The standard measurement of how galaxies grow at fixed mass. The reference point for the expansion reading of Table 2.

Redshift: stepped or smooth, local or not

[20] Hawkins, E., Maddox, S. J., & Merrifield, M. R. (2002). "No periodicities in 2dF Redshift Survey data." *Monthly Notices of the Royal Astronomical Society* 336, L13. doi:10.1046/j.1365-8711.2002.05940.x
A large survey tested for claimed preferred redshifts, with a null result. Section 4.1 adds Euclid to that record.

[21] Wojtak, R., Hansen, S. H., & Hjorth, J. (2011). "Gravitational redshift of galaxies in clusters as predicted by general relativity." *Nature* 477, 567–569. doi:10.1038/nature10445
Light from the centre of a galaxy cluster arrives slightly redder. The counterpart of a local redshift rule in standard physics, and the benchmark for Section 4.6.

Rest, form and surroundings

[22] Dressler, A. (1980). "Galaxy morphology in rich clusters: implications for the formation and evolution of galaxies." *The Astrophysical Journal* 236, 351–365.
The relation between form and density: smooth galaxies live in dense places.

[23] Peng, Y., et al. (2010). "Mass and Environment as Drivers of Galaxy Evolution in SDSS and zCOSMOS and the Origin of the Schechter Function." *The Astrophysical Journal* 721, 193–221.
Shows that mass and surroundings act separately on star formation. The pattern of Figure 3 in standard language.

Spin sense

[24] Slosar, A., Land, K., Bamford, S., Lintott, C., et al. (2009). "Galaxy Zoo: chiral correlation function of galaxy spins." *Monthly Notices of the Royal Astronomical Society* 392, 1225–1232. arXiv:0809.0717
The earlier test of shared handedness among neighbours. Finds a hint below half a megaparsec at two to three standard errors.

[25] Lintott, C., et al. (2011). "Galaxy Zoo 1: data release of morphological classifications for nearly 900 000 galaxies." *Monthly Notices of the Royal Astronomical Society* 410, 166–178.
The volunteer labels, clockwise and anticlockwise, that calibrate the spin measure of Section 4.7.

[26] Puerari, I., & Dottori, H. A. (1992). "Fourier analysis of structure in spiral galaxies." *Astronomy & Astrophysics Supplement Series* 93, 469.
The Fourier method in the plane of ln r and angle on which the spin measure is built.

Archives and services

[27] European Space Agency. Euclid Science Archive, table access service. eas.esac.esa.int/tap-server/tap
Catalogues, spectra and image cutouts of the release. Open without registration for the queries used here.

[28] NOIRLab. Astro Data Lab, table access service. datalab.noirlab.edu
Hosts the DESI redshift tables used as a control.

[29] Sloan Digital Sky Survey. SkyServer, Data Release 17. skyserver.sdss.org/dr17
Hosts the Galaxy Zoo table and the images used to calibrate the spin measure.