Style Guide for *Euclid* Publications

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with LaTeX help by *Thomas Erben*

based in part on the Style Guide for *Planck* papers

written by

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1 Purpose

The preparation, analysis, and scientific exploitation of the *Euclid* mission will be accompanied by a large number of publications, ranging from internal technical reports to research papers and reviews. *Euclid* publications represent, beside the *Euclid* data products, the most important and visible deliverable of the *Euclid* mission, and they provide the main communication channel of the *Euclid* mission to the 'outside world'. For this reason alone, their quality should match that of the scientific analysis. It is therefore mandatory that publications of the Euclid Consortium are prepared with great care.

Furthermore, due to the size of the consortium and the internal communication rules, the typical *Euclid* publication will be read by several times more people than the average publication, even before the publication is submitted to a journal or put on the arXiv. Issues with style and language in each manuscript must therefore be avoided as far as possible!

- Please keep in mind that authors of a scientific publication should be proud of the product they deliver, and in particular, should be proud to be able to write a publication representing the largest collaboration ever in astronomy, centred on the most relevant mission for cosmology (and a mission of utmost relevance for almost all other branches of astrophysics) in the coming decade.
- Most people will read the arXiv version of the *Euclid* publications, which renders absurd the often-heard attitude that the editorial office of the journals will take care of style issues. Our prime audience consists of those people who read the papers on the arXiv as soon as they appear; those people typically do not look at replacements. Therefore, you need to get it right the first time!
- Issues of style and language will be commented on by members of the Euclid Consortium during the manuscript preparation phase, whether they are coauthors or not, and will thus unnecessarily multiply the number of comments on manuscripts, perhaps distracting from comments related to the scientific contents.
- By preparing a manuscript that is aimed at being distributed to a collaboration of far more than 1000 colleagues, it is a matter of respect to aim at a version that is free of style issues and other obvious weaknesses, as much as possible.

This document therefore provides a guide for the preparation of manuscripts, collecting some of the main issues that are frequently disregarded (as judged from looking at a random set of manuscripts put on the arXiv), aimed at helping authors to prepare their manuscripts with a high standard of style. In addition, this Style Guide is issued with the aim of achieving a uniform appearance of all *Euclid* publications with respect to style and notation. Regarding the latter, the Parameter Definition Document for *Euclid*, which is currently in preparation, will define the standard notation and use of terms for *Euclid* publications. The information in these publications will be easier to communicate and to digest, both for publications meant for internal use (e.g., technical reports, work package reports, etc.) as well as to the general community, if the notation and conventions for physical quantities follows a unified scheme. For example, reference to equations in other *Euclid* publications will be considerably easier if the same notation and conventions are used.

The Euclid Consortium Editorial Board (ECEB) therefore issues this Style Guide and requests that publications of the Euclid Consortium, as defined in the Euclid Consortium Publication Policy document, follows the style, notation, and conventions defined in this document. In addition, the ECEB strongly encourages the members of the Euclid Collaboration to follow this Style Guide as closely as possible also in *Euclid*-related publications and *Euclid* internal documents.

Whereas the bulk of this Guide specifically applies to papers prepared with LaTeX – and it is assumed that the vast majority of *Euclid* publications will be written using LaTeX – most of its contents also applies to manuscripts prepared by other text processing tools.

2 General issues

For general typesetting matters, we refer to the general LaTeX User's guide and reference manual by Leslie Lamport, as well as to the web page `http://www.latex-project.org`. Here we mention a number of issues that are frequently not done in the correct way, and to aspects that are specific to the (astro)physics literature. We have prepared a style file, `euclid.sty`, in which some useful definitions are employed (see Sect. 3 below).

2.1 Units

1. Units should *always* be in roman font, *never* in italics. For example, $H_0 \approx 68\,\mathrm{km\,s^{-1}\,Mpc^{-1}}$ (written as `$H_0\approx 68\,{\rm km\,s^{-1}\,Mpc^{-1}}$`) is correct, but writing $H_0 \approx 68\,km\,s^{-1}\,Mpc^{-1}$ is *wrong*. It may take extra work to control the font inside math mode, but it *must* be done. Like many of the other issues to be mentioned in this section, you will quickly get used to these rules, and knowing (and obeying) them makes you a better author. Commands for many common units are defined in `euclid.sty` (see Sect. 3.1 and Tables 1, 2, and 3) so that they can be used in or out of math mode, producing the correct (roman) fonts in either case. An alternative way of getting units correct is to use the `siunitx` package, which is briefly described in Appendix A.

2. Units should *always* be singular when they are abbreviated, *never* plural. For example, "arcmin", not "arcmins". Unit abbreviations are without a period, e.g., "Dec" for declination, or "arcsec".

3. When units are written out in text (as they should be when used without a numerical value), they are not capitalized even if formed from a proper name, and the plural is always formed by adding an "s". For example, "a separation of several arcminutes" or "the flux density values were converted to janskys", not "janskies" or "Janskys".

4. Use the correct abbreviation for units, e.g., "kV" not "KV", "GHz" not "Ghz".

5. Microns as a unit of length should be written "µm", defined in `euclid.sty` as `\micron`.

6. Units should be separated from numbers (and from other units) by a "thinspace", available in LaTeX in both math and non-math modes as "`\,`". For example, $H_0 \approx 68\,\mathrm{km\,s^{-1}\,Mpc^{-1}}$ is obtained by `$H_0\approx 68$\,km\,s$^{-1}$\,Mpc$^{-1}$` or, alternatively and much easier to read, `$H_0\approx 68\,{\rm km}\,{\rm s}^{-1}\,{\rm Mpc}^{-1}$`. However, such long source text for the units make the LaTeX file clumpsy and difficult to read for other people (co-authors). Therefore, it is better to use the macro `\kmsMpc`, which is defined in `euclid.sty`, together with several other useful units (see below), and which works either inside or outside of math mode. Thus, the previous expression was obtained with `$H_0\approx 68\,\kmsMpc$`; note that the proper spacing is included in the definition of the units macro.

7. Avoid units in subscripts – it is better to define an appropriate notation at the first use, e.g., "the flux density at 70 GHz, S_{70} ,...", instead of $S_{70\,\mathrm{GHz}}$ (or the wrong $S_{70\,GHz}$).

8. It is better to write $\mathrm{km\,s^{-1}}$, instead of km/s. This applies to all compound units, e.g., $\mathrm{kg\,m^{-3}}$, rather than $\mathrm{kg/m^3}$. Also note that the abbreviation for the unit of time is "s", not "sec".

9. Degrees, arcminutes, and arcseconds are generally typeset as symbols, °, ′, ″, which can be obtained with `\degree`, `\arcminute`, and `\arcsecond`, defined in the `siunitx` and `euclid.sty` packages. Non-integer values should place the symbol over the decimal point, e.g., $3\overset{\prime}{.}5$ (written as `\ang{;3.5;}`) instead of $3.5'$.

   To conveniently typeset angles correctly, the `siunitx` and `euclid.sty` macro packages contain appropriate definitions, e.g., to get the right ascension $12^\circ\,16'\,23\overset{\prime\prime}{.}45$, you need to write `\ra{12;16;23.45}`. Correspondingly, `\ang{-23;14;12.38}` yields $-23^\circ\,14'\,12\overset{\prime\prime}{.}38$, while `\ang{-23;14;12}` and `\ra{13;45;}` yield $-23^\circ\,14'\,12''$ and $13^\circ\,45'$, respectively.

   Use "$\mathrm{deg^2}$" rather than "square degrees" or "sq. deg.", similarly "$\mathrm{arcmin^{-2}}$", etc.

10. The Solar values provide frequently used units for mass and luminosity, $\mathrm{M_\odot}$ and $\mathrm{L_\odot}$. Note, since they are units, they are in roman font. Thus the equation $M_\odot = 1\,\mathrm{M_\odot}$ (written as `$M_\odot=1\,{\rm M}_\dot$`) is meaningful (though admittedly not very informative), stating that the mass of the Sun is one Solar mass. We have reconsidered this point: Although in many situations it might be correct to use roman fonts for these quantities, A&A explicitly requires the Solar units to be in italics, so that is what we recommend. Thus, Solar mass and luminosity should be written as $M_\odot$ and $L_\odot$ (`M_\odot`, `L_\odot`), respectively.

11. For EC publications, the use of 'natural units' like $G_\mathrm{N} = 1 = c$ is not supported.

2.2 Punctuation, abbreviations, and capitalization

1. The abbreviations "i.e." (an abbreviation for "that is to say"; from the Latin "id est") and "e.g." (an abbreviation for "for example"; from the Latin "exempli gratia") should be in roman font; they should not be used at the beginning of a sentence. Please avoid the common error of writing "c.f." for "conferatur" (compare) – this should be "cf.".

2. Precise rules for the use of commas are complicated. As a rough guide, if adding a comma would help the reader to take a brief pause, which would avoid ambiguities and make the sentence easier to understand, then a comma should definitely be added. However, in many instances the inclusion of a comma is a matter of taste.

3. Use the 'serial comma' (also called 'Oxford comma'), i.e., a comma precedes the "and" before the final item in a list of three or more, e.g., "deflection, shear, and magnification". A serial comma also applies to "or", e.g., "ellipticals, spirals, or S0s".

4. Use double quotation marks, as in the previous item, to denote an actual quotation. Use single quotation marks if you want to introduce a technical term. Thus, in the previous item, we said "Use the 'serial comma' . . . " and then defined that technical term. When using the technical term again, then do not use quotation marks again (i.e., you use the quotation marks only the first time). Again, see the previous item as an example. Quotes within a quotation should be marked with single quotation marks. Note the difference between the opening and closing quotation marks – on an English keyboard, the opening

ones are on a key at the top left of your keyboard (together with the tilde), the closing ones on the middle right, i.e., the apostrophe; see also item 3 in Sect. 2.4. The same key can be used for arcminutes or arcseconds (as in "FWHM = 10″"), but in this case it needs to be in math mode, i.e., FWHM = 10" is wrong.

5. When an equation is referred to in parentheses the brackets are dropped, as in "(see Eq. 42)". Thus, in such cases one cannot use the macro `\eqref` which adds the parentheses. Apart from this case, equation numbers should always be in parentheses. In contrast, numbers of figures, tables, and sections are not in parentheses.

6. The IAU formally recommends that the initial letters of the names of individual astronomical objects should be printed as capitals (see the IAU Style Manual, *Trans. Int. Astron. Union*, vol. 20B, 1989, Chap. 8, p. S30); e.g., Earth, Sun, Moon, etc. "The Earth's equator" and "Earth is a planet in the Solar System" are examples of correct capitalization according to these rules. However, "zodiacal" should *not* be capitalized.

7. Capitalize "Galactic" when referring to the Milky Way, e.g., "Galactic plane". Capitalize "Universe" when referring to the cosmos in which we live, reserving "universe" for different theoretical possibilities.

8. "Zeldovich" should be written without the apostrophe in the middle. In general, names that are normally not written in Latin characters should be transliterated following the preference of the owner of the name, as far as possible.

9. Software program names should be set in the fixed-width "tt" font, e.g., `HEALPix`, `athena`, `lensfit`, and `SExtractor` (obtained with `\texttt{HEALPix}`, `\texttt{athena}`, `\texttt{lensfit}`, and `\texttt{SExtractor}`).

10. The abbreviation of declination is "Dec", not "DEC" or "Dec.". The abbreviation of right ascension is "RA", not "R.A.".

11. The Oxford English Dictionary (OED, the ultimate authority for standard English) capitalizes "Gaussian". We will adopt that as the *Euclid* convention. Similarly, we use "Bayesian", "Newtonian", etc. We will not use capitals for "dark matter", "dark energy", or "general relativity".

12. Italics should be reserved for emphasis. Do not use italics for expressions in Latin (or other languages). Italics should also not be used for special phrases; it is better to define a special phrase using quotations the first time it is introduced, and leave it at that.

13. Itemized lists should be properly punctuated. This is achieved through one of two possibilities. The first is a list (usually of fairly short statements) introduced using a colon and with the items separated by semicolons, so the entire list is read as a single sentence. Note that in those lists, no additional colons can be used in the individual items. The second is a list of longer entries, *not* introduced with a colon, each item of which should start with a capital letter and end with a period.

    Here is an example of the first kind of itemized list:

    – this is the first item;

    – this is the second item;

– and here's the third item, which can be long, but can only consist of a single sentence in order to ensure the punctuation is consistent.

Here is an example of the second kind of itemized list, which is *not* introduced with a colon.

– This is the first item, which should start with a capital letter and end with a full stop.

– This is another item, which might be longer than any items in the first kind of list.

– This is one more item, which can be long. Items in this sort of list can consist of multiple sentences and hence couldn't be part of a semicolon-separated list.

Whether these are numbered or unnumbered lists is a matter of choice, but numerical lists are preferred when the order is important, or if specific items are going to be referred to in the text. The particular bullet symbol used is also a choice (within reason) but often specified in a journal's instructions. If the items in a list are essentially whole paragraphs, then it may be better to use the `\paragraph{...}` environment, which gives a separate heading for each item.

14. *Semicolon.* Quoting from the Oxford English dictionary, "The main task of the semicolon is to mark a break that is stronger than a comma but not as final as a full stop. It is used between two main clauses that balance each other and are too closely linked to be made into separate sentences, as in these two examples: 'The road runs through a beautiful wooded valley; the railway line follows it.' and 'An art director searched North Africa; I went to the Canary Islands.' You can also use a semicolon as a stronger division in a sentence that already contains commas."

15. Avoid using two consecutive pairs of parentheses, as in "...use the model of Navarro et al. (1997)(hereafter NFW) for approximating ...". Instead, this should be written as "...use the model of Navarro et al. (1997; hereafter NFW) for approximating ...", which can be achieved within BibTeX with `use the model of \citet[][hereafter NFW]{navarro+97} for approximating`.

16. *Line numbering.* It is preferred that draft manuscripts of papers include line numbering, for easier referencing, e.g., regarding comments made by internal reviewers or other EC members. Before submitting the paper to a journal and/or the arXiv, the numbering should be removed.

17. Please be aware that after arXiv submission, people can access your LaTeXsource file; hence be sure to remove text in that file that has been commented out and that you would not like others to read.

2.3 Language

In accordance with the Publication Policy Document, which states "As Euclid is a European mission and the EC is primarily European, EC full members will be encouraged to publish in European journals", we strongly recommend that EC papers be written in British English.

1. *Performance* as it will be used in *Euclid* papers is a singular noun. For example, "The performance of *Euclid*" is correct. "The performances of *Euclid*" is not.

> "Performance" is a noun with two related meanings. One type of "performance" is quantized and can be counted, the other is continuous and can be measured. Example 1: "The orchestra will give one performance on Monday and two performances on Thursday." Example 2: "The performance of the *Euclid* telescope at low temperatures was difficult to measure." The key distinction is that the quantized, countable type of performance has number, i.e., it is singular or plural depending on the count. But the continuous, measurable version, has no number. It *never* has an "s" at the end. The countable type of "performance" is unlikely in the *Euclid* papers. Therefore a global search and replace of "performances" with "performance" will safely eliminate misuse.

2. *Noise* as it will be used in *Euclid* publications is also measurable and continuous, and therefore a singular noun. "The noises of *Euclid*" is not correct, but "The noise components of *Euclid*" is.

3. *Emission*, as in "bright diffuse emission," and as it will most likely be used in the *Euclid* papers, is also singular. "Bright diffuse emissions" is not correct.

4. *Significance* is similarly used as a singular noun, so that "significances" is incorrect. If necessary write "levels of significance". Use of the word "significant" when *not* discussing statistical significance can be confusing. Be careful, or avoid using it. Synonyms that can be usefully substituted include "considerable", "sizable", and "substantial". Furthermore, try to be quantitative whenever possible; instead of "discriminate with a high significance", it is better to state the level of significance at which the discrimination can be made.

5. *Allow* and *permit* are transitive verbs, and hence require an object.

   > "The accuracy of this model allows us to remove the effects of thermal fluctuations from the data directly" is correct.
   >
   > "The accuracy of this model allows removal of the effects of thermal fluctuations from the data directly" is correct.
   >
   > "The accuracy of this model allows to remove the effects of thermal fluctuations from the data directly" is incorrect, because "to remove" is not an object.

6. One of the features of English usage, that sometimes verbs are followed by an infinitive while at other times they are followed by a gerund, is explained quite well at `http://www.englishpage.com/gerunds/index.htm`. One example containing both forms is: "He keeps thinking about his theory, but needs to obey observational constraints." Here, the choice of the form depends on the verb ("to keep", "to obey").

7. "*Modelisation*" (or "modelization") is not in the OED, at least not yet. Therefore, it should not be used. "Model" or "modelling" are probably what you want.

8. *"Associated to"* is usually incorrect in English and should be "associated with."

9. *"Probably" and "likely"* are not the same words. "This theory is probably correct" or "this theory is likely to be correct" are both fine, but "this theory is likely correct" is wrong.

10. All sentences must have a verb; subject and verb must match in number.

11. *That* and *which* should be used as explained in this paragraph from the A&A English Guide:

    "That" (not in phrases such as "enough ... that ...") is never preceded by a comma, because it introduces a restrictive clause. If tempted to use a comma there, then check that "which" is not more appropriate (=non-restrictive). That "that" is already used for so many functions makes it all the more necessary to keep to the conventions. Even though standard English allows "which" to be used for the restrictive dependent clause, scientific articles prefer to keep the difference to the non-restrictive even clearer by using only "that" without comma or "which" with a comma when non-restrictive. Example: "Both metallicity components appear to have a common origin, which is different from that of the dark-matter halo." versus "Both metallicity components appear to have a common origin that is different from that of the dark-matter halo." One can also summarize the issue as "that defines, which describes", as in following example: "This is the algorithm that we used, which is better than the previous one."

    If none of this makes sense, concentrate on the examples, and remember that no comma should precede "that", but a comma should always precede "which".

12. "Between A and B", "from A to B", or "in the range A–B" are OK, since these expressions fully make sense when read in sentences. In contrast, "Between A to B", "from A–B", and "between A–B" are not OK.

13. It is better to use the term "uncertainties" than "errors." When giving uncertainties, state the confidence interval and its probability content, e.g., 68.3% or 99.5%. Avoid using, e.g., $2\,\sigma$ or $3\,\sigma$, especially if the underlying distribution is non-Gaussian or asymmetric. An uncertainty introduced by "$\pm$" (e.g., $x \pm y$) is taken to be a symmetric 68.3% confidence interval ($[x - y,\ x + y]$) unless otherwise stated. Upper limits need careful explanation.

14. Use active voice when suitable, particularly when necessary for correct syntax (e.g., "To address this possibility, we constructed a λ Zap library...", not "To address this possibility, a λ Zap library was constructed...").

15. Write concisely (e.g., "even though," not "in spite of the fact that").

16. When two or more similar terms are used throughout the text, either make the usage consistent or clarify the distinction(s), as appropriate. For example, in a paper discussing weak lensing convergence peaks and shear peaks, the difference needs to be made clear and these terms have to be used consistently.

17. Avoid using terms such as "novel", "first", or "our laboratory has pioneered..." to describe the present work. The novelty should be apparent from the text or results without being highlighted. Do not mention your own work in progress within the text.

18. "A and B" or variants such as "A together with B" are plural subjects and need a plural verb, e.g., "A and B are...".

19. Avoid using "systematic" or "systematics" as a noun. Use "systematic errors" or "systematic effects".

20. The names of things do not usually need to be capitalized, even when defining an acronym, e.g., "active galactic nucleus (AGN)", not "Active Galactic Nucleus (AGN)", and "cosmic microwave background (CMB)", not "Cosmic Microwave Background (CMB)". Note that by the former definition, AGN is singular, therefore "active galactic nuclei" should be abbreviated by "AGNs". As per convention, "AGN" is the acronym for both, "active galactic nucleus" and its plural, "active galactic nuclei".

21. After introducing an acronym, use only the acronym.

22. "Time-ordered data" and "high-redshift galaxies" should be hyphenated. "Sidelobe", "nonlinear", "mapmaking", and "submillimeter" should not. As another example, it should be "far sidelobes" rather than "far-side lobes". The rules of hyphenation can be daunting[1] because there are so many cases, but most of them involve nouns used as adjectives in multiple combinations, affecting a relatively small number of cases. If in doubt, do not hyphenate; even when technically correct in a compound adjective, it risks looking fussy.

23. One hyphenation guideline is clear, namely that a hyphen is included in adjectival phrases but not in nouns. So it is "the power-law spectrum", but "a power law was fit" and "the high-ℓ behaviour", but "an effect seen at high ℓ." Similarly, "we measure redshift-space distortions in redshift space", "we measure line-of-sight effects along particularly dense lines of sight", "the dark energy equation of state is commonly characterized by the equation-of-state parameter w".

24. Nouns used adjectivally are *never* plural in English, *not even once*. For example, "the galaxy redshifts" is correct, even although there are multiple galaxies, but "the galaxies massess" or "the clusters masses" are incorrect.

25. Letters denoting wavebands (e.g., g, r, i, z, J-band) should be written in italics. Please see Sect. 3.3 for denoting the specific *Euclid* wavebands.

26. The ampersand, "&", is not acceptable in a sentence. Write, e.g., "using the J and H data", not "using the J & H data". However, an ampersand is acceptable, and in some journals the rule, in references, as in "Einstein & Kraus (1945)".

27. Spell out numbers up to and including ten; use digits above ten except at the beginning of a sentence.[2] You can also spell out large numbers, such as "the simulation followed more than six billion particles", instead of "the simulation followed $\sim 6.24 \times 10^9$ particles". However, numbers with units are always written with digits, including things like "$5\,\sigma$". Similarly, quantities that are multiplicative factors (even if they happen to be integers) will often be better written using digits, e.g., "5 times higher" or "a factor of 2" (as these could just as well have been 5.1 or 2.3).

28. Sentences should not start with numbers or variables. Rewrite the sentence if necessary.

29. "*However*" is often misused, as in "We searched for this effect, however it was not found." Here one should use "but" rather than "however."

[1] see, e.g., `http://en.wikipedia.org/wiki/English_compound`

[2] And don't ask about the pathological case of ranges like "seven to 11"!

30. Use "data set" rather than "dataset" or "data-set".

31. The word "data" is always plural (e.g., "these data show"; the singular of "data" is "datum"), while "none" can be singular (e.g., "none of the sky is masked") *or* plural (e.g., "none of the galaxies were spirals").

32. The common abbreviation for "root mean square" should be "RMS", rather than "R.M.S." or "rms". Most abbreviations and acronyms should be in capitals, such as GR (general relativity), PDF (probability distribution function), or DM (dark matter). Note, however, that there are some exceptions; e.g., the survey is called KiDS (Kilo Degree Survey).

33. It often sounds more elegant to avoid using the word "do", but instead to use "perform" or "carry out". For example, "we carried out the calibration procedure" rather than "we did the calibration procedure".

34. As the word "as" can be used as an adverb or preposition, as well as as a conjunction (note this example), then sentences can sometimes be difficult to parse. Substitution of "since" or "because" for "as" where appropriate (particularly as a conjunction) may avoid confusion.

35. The word "comprised" is sometimes misused in the phrase "is comprised of," which should be replaced with the more grammatically correct "is composed of" (or perhaps "comprises").

36. The correct word is "publicly," not "publically." However, in common examples, there is often a better way to express the same meaning without using the word at all.

37. "Non" is a prefix, not a word, and hence a hyphen is required in words such as "non-Gaussian" and "non-relativistic". You may wonder, as we said before that "nonlinear" is not hyphenated, but that is what the OED gives us. Who says that language is logical?

38. Avoid the use of noun clusters, such as "telescope guidance CCD readout electronics" or "cluster mass function uncertainty simulation". More examples of noun clusters can be found at `https://users.soe.ucsc.edu/~karplus/185/noun-cluster.html`.

39. Prefer the usage of verbs over nouns – this reads better than "The preference of nouns over verbs should be avoided."

40. The meaning of "S/N" is "signal-to-noise ratio"; therefore do not use the expression "S/N ratio".

2.4 Typesetting in LaTeX

1. *Paragraphs*. The start of a new paragraph should always be indicated by a blank line in the LaTeX code. Special layout commands such as `\vskip`, `\noindent`, or `\midskip` are not generally required, since the journal-supplied LaTeX styles will take care of layout. *Never* use `\\` to start a new paragraph. More generally, do not play around with layouts (like spacings, font sizes etc.), unless you have very good reasons. Try to avoid excessively long paragraphs; it is better to organize the text such that paragraphs of finite size form logical units and structure the text.

2. *Blank lines*. There should be no blank line before or (particularly) after a displayed equation in your input file unless you really intend to start a new paragraph. If you want some visual separation between displayed equations and text in your input TEX file (which is very helpful to keep order in your file, in particular if several people will be editing it), use comment lines, e.g.,

```
Text blah blah blah
%
\begin{equation}
E=mc^2\;,
\label{eq:Emc2}
\end{equation}
%
where $c$ is the speed of light in vacuum.
```

3. *Quotation marks*. Use "`` ` `` " and "`'`'", not the double-quote character found on English keyboards above the apostrophe. Note the difference between the opening and closing marks – using "*Euclid* is a great mission" is not correct, but should read "*Euclid* is a great mission" (see also item 2.2.4).

   Note: Quotation marks can be set conveniently and correctly with the `csquotes` package. If this package is included, you obtain correct quotation marks (according to the specified document language) by putting your text within the `\enquote{...}` command. Within this document, the LATEX-command `\enquote{\textit{Euclid} is great!}` results in "*Euclid* is great!"

4. *Dashes*. Distinguish the following:

   - hyphen, produced with a single dash (`-`) and used for compound words (e.g., "free-free", "high-redshift galaxies") and word breaks;
   - en-dash, produced with two dashes (`--`) and used for a range, as in "*Planck* took data in 2009–2013"; also, multiple names in an expression, such as in "Sunyaev–Zeldovich effect" or "Robertson–Walker metric", should be written with an en-dash, not just a hyphen;
   - em-dash, which is written in TEX with three dashes (`---`), appearing as —. With no spaces around it, this can be used as a punctuation mark, as an alternative to using an en-dash with spaces around it;[3] and
   - minus sign, produced by a dash in math mode (`$-$`). Note that minus signs can *only* be typeset in math mode (including in tables). Conversely, hyphens, en-dashes, and em-dashes cannot be typeset in math mode.

   Always be sure to set the complete mathematical expression in math mode, for example, "`$-17.2\pm0.3$`" rather than "`$-$17.2$\pm$0.3`" in order to get the correct spacing. The former gives -17.2 ± 0.3, while the latter results in -17.2 ± 0.3, i.e., with less space.

   An exception from this rule occurs when the relation has no left-hand side, as in "at redshifts ~ 1.5"; here the space between $\sim$ and 1.5 may be so large as to make them look

[3] Most journals use the latter way of writing dash as punctuation – as here, rather than the three dashes— which indeed looks quite different. In *Euclid* publications, we will adopt this way (space, two dashes, space) of typesetting.

like two separate symbols, rather than a single unit. It is thus better to write this as "at redshifts ~ 1.5", using a smallspace, i.e., as `$\sim$\,1.5` or `${\sim}\,1.5$`.

5. *Symbols*. Use italics (the default in math mode) for all single-letter symbols that represent variables (i.e., quantities that have a numerical value). For example, use `$H_0$`, not `H$_0$` (H_0, not H_0) – and be sure to avoid the common error of writing H_o. Similarly, the redshift z should always be in italics, including in such expressions as "high-z" (obtained with `high-$z$`) or photo-z. Furthermore, note that *all* equations need to be in math mode, therefore "a QSO at z=7.2 was found" is a great discovery, but should be written as "a QSO at $z = 7.2$ was found".

6. *Mixing symbols and words*. Use relational symbols ($=$, $<$, $\simeq$, etc.) in equations, not in text. Write an equation, or use words. For example, write "frequencies of 30 GHz and above", rather than "frequencies $\geq$ 30 GHz". Similarly, write "an average factor of about 1.8", rather than "an average factor of $\simeq$ 1.8". Better yet (see next item), write "an average factor of 1.8", omitting the meaningless "about".

7. *Approximations*. Use "about", "around", and "approximately" in preference to "$\sim$", but use all sparingly. They are often almost meaningless, and their use is a bad and annoying habit on the part of the writer. If the uncertainty in a numerical value cannot be represented reasonably by the number of significant digits, specify the uncertainty explicitly. A special microlevel of hell is reserved for those who write "about $\sim$".

   Do not use "$\sim$" when you mean "$\propto$".

   Do not use both "$\simeq$" (`\simeq`) and "$\approx$" (`\approx`) in the same paper unless you explicitly explain that they mean two different things. If in doubt, use "$\approx$" (and see the point above).

   For "less (and greater) than approximately" use the `euclid.sty` macro `\lsim` (and `\gsim`), or corresponding macros provided by the journal, but avoid mixing them.

8. *Sub- and superscripts*. Use roman fonts for tags or labels in sub- and superscripts (e.g., n_e or z_rec) and for multi-letter operators. Hence, whenever a sub- or superscript denotes an abbreviation or a word, it *must* be in roman. If a sub- or superscript denotes a variable, it should be in italics. This avoids ambiguities by always explicitly distinguishing variables from abbreviations. For example, z_i (obtained with `$z_i$`) might be the ith redshift under consideration, while z_i (obtained with `$z_{\rm i}$`) might be defined as the reionization redshift or the initial redshift at which a simulation starts. There may remain some ambiguities, e.g., in the velocity dispersion σ_v, since "v" is the variable for velocity, and "v" is an abbreviation for velocity. However, it is worth trying to follow the roman/italic rule as much as possible.

   Note that z is not an acronym for redshift, but a variable, so that the redshift uncertainty is written as σ_z (no roman "z"). The abbreviation should be in lower case letters, as in Ω_m for the matter density parameter, unless it is for a name, as in θ_E for the Einstein angle, or as in G_N for Newton's constant of gravity. In this case, it is recommended that the sub- or superscript is reduced in size, as otherwise it may happen that it becomes larger than the variable itself, such as in ν_E. For this purpose, the macro `\sfont` is defined in `euclid.sty`, such that θ_E is obtained with `$\theta_\sfont{E}$`.

9. *Derivatives,* e*, and* i. The differential operator should be written in roman "d", e.g., $\mathrm{d}y/\mathrm{d}x$, encoded as `$\diff y/\diff x$`, where the macro "`\diff`" is defined in `euclid.sty`. The Euler number $\mathrm{e} \approx 2.718$ and the imaginary unit $\mathrm{i} = \sqrt{-1}$ should also always be in roman.

10. *Functions*. Always use the standard LaTeX commands for operators, `\exp`, `\cos`, `\sin`, `\ln`, etc. Correct: `$\ln{S}$`. Wrong: `ln($S$)`, or `${\rm ln} S$`, or anything else. Using the LaTeX commands will also preclude capitalization of these operators, which is almost always incorrect.

11. *Logarithms*. In order to avoid ambiguities, one should exclusively use `\ln` for the natural logarithm, e.g., $\ln(\mathrm{e}) = 1$, but `\logten` (which is defined in `euclid.sty`) for the logarithm with base 10, such as $\log_{10}(100) = 2$. Thus, the use of `\log` is avoided altogether. Do not use "lg" for the base-10 logarithm – this is not a standard mathematical notation.

12. *Vectors and tensors*. We recommend typesetting vectors and tensors with `\vec{A}` and `\tens{B}` which are defined in `euclid.sty`. These produce bold italics and upright sans-serif characters, i.e., $\boldsymbol{A}$ and B, respectively.

13. *Numbers* with powers of 10 shall be written as, e.g., 6.3×10^4 (`$6.3\times 10^4$`), rather than $6.3 \cdot 10^4$, $6.3\,10^4$, or even 6.3 e4; the latter also applies to values in tables. Reserve the operator `\cdot` for the scalar product of two vectors, as in $\boldsymbol{a} \cdot \boldsymbol{b}$. Hence, do not use `\cdot` or `\times` for normal multiplication; instead, use proper spacings. However, you should use `\times` for the binary operator in multi-line equations, or in cases like "a 1024×2048 pixel grid" or an "$N_x \times N_y$ dimensional matrix".

14. *Brackets*. The usual ordering of brackets is $\{[(\ldots)]\}$. Only deviate from this if there is good reason, and never use the same type for adjacent brackets. Make sure that the vertical size of brackets corresponds to the vertical size of what they bracket. Never write something like
$$(\frac{a+b}{c+d})\,; \quad \text{instead that needs to be} \quad \left(\frac{a+b}{c+d}\right)$$
by dynamically adjusting the height of the bracket, obtained with `\left( \frac{a+b}{c+d} \right)`. The `euclid.sty` file contains macros for this: you obtain
$$\left(\frac{a}{b}\right)\,, \quad \left[\frac{a}{b}\right]\,, \quad \left\{\frac{a}{b}\right\}\,, \quad \left|\frac{a}{b}\right|\,, \quad \left\langle\frac{a}{b}\right\rangle\,,$$
from `\paren{\frac{a}{b}}`, `\brackets{\frac{a}{b}}`, `\curly{\frac{a}{b}}`, `\abs{\frac{a}{b}}`, `\ave{\frac{a}{b}}`, respectively.

    Distinguish angle brackets, `$\langle x \rangle$`, yielding $\langle x \rangle$, often used to denote expectation or mean values, from the inequality operators $<$ and $>$; `$<x>$` yields $< x >$ which looks ugly. Note that "`<`" and "`>`" must never be used outside math mode.

15. *Spacings.* Use proper spacing when typing equations. Instead of $f(x)g(x)x^2$, adding small spacings (`\,`), or slightly larger ones (`\;`) makes that more easily readable, i.e., $f(x)\,g(x)\,x^2$ (which is obtained with `$f(x)\,g(x)\,x^2$`). Further examples are
$$f(x)\frac{a\mathrm{e}^{2\mathrm{i}\varphi}}{x^2+b^2}\mathrm{J}_0(kx) \quad \text{versus} \quad f(x)\,\frac{a\,\mathrm{e}^{2\mathrm{i}\varphi}}{x^2+b^2}\,\mathrm{J}_0(kx)\,,$$

(`f(x)\,\frac{a\,{\rm e}^{2{\rm i}\varphi}}{x^2+b^2}\,{\rm J}_0(kx)\;,`), where again adding small spaces leads to a better result. Note also that the Bessel function J_0 is written in roman (`{\rm J}_0`), as are the other special functions like sin, exp etc. Proper spacing is *a must* when using composite symbols, such as Δx or $\mathrm{d}z$, as in

$$2\pi\Delta x k \quad \text{and} \quad \int_a^b \mathrm{d}z z^2 f(z) \,,$$

which *must* be written as

$$2\pi\,\Delta x\,k \quad \text{and} \quad \int_a^b \mathrm{d}z\; z^2\, f(z) \,,$$

where in the second example the $\mathrm{d}z$ is separated from the integrand by a medium space (`\;`), i.e., it is obtained with `\int_a^b \diff z \;z^2\, f(z) \;,` (note the spacing between the equation and the punctuation).

16. *Acronyms and multi-letter variables*. Try to avoid using an acronym as a variable (e.g., "$SFR = 10\,\mathrm{M}_\odot/\mathrm{yr}$"), because it is cumbersome and causes tension with the rule about variable names being in italic font. Define a new symbol instead (e.g., "the star formation rate, $\mathcal{R}$"). But if you *do* use a multi-letter symbol for a variable, it *must* be in roman, e.g., "$\mathrm{SFR} = 10\,M_\odot\,\mathrm{yr}^{-1}$", obtained with `${\rm SFR} = 10\,\Msolar\,\rm yr^{-1}$`, to avoid the confusion of whether, for example, "em" is a single symbol or "e" times "m". Another example that should be mentioned explicitly concerns the evaluation of correlation functions: the number of pairs in the data should be denoted as DD, that of pairs between data and a random catalogue by DR, etc.

17. *Long equations*. *Do not ever* try to make equations fit by using `\small` (or other manipulations of fonts)! Instead use `eqnarray` or, better, the `align` environment to break lines and split the equation over more than one line. In most cases, a new line will start with a binary operator, such as "+" or "−", and recall that the binary operator is placed at the beginning of the new line, not at the end of the old line. If the binary operator is a multiplication, use explicitly the "×" symbol obtained with `\times`.

18. *Expression* χ^2. In the context of statistics, write χ^2 rather than "chi-square." Whether giving χ^2 or reduced χ^2, always give the number of degrees of freedom N_{dof}.

19. *Equation references*. All equations that you are referring to with `\ref` must have the corresponding `\label` – please use this mechanism only. Punctuate a displayed equation in the same way as ordinary text. This means that displayed equations should usually be followed by a comma or period, which generally look better preceded by a thin space `\,` or a medium space `\;`. Note that in most cases a colon before the displayed equation is not needed.

20. *Equation numbering*. Although not obligatory, it is good practice to number all equations. Even if you do not intend to refer to the equation elsewhere in the paper, other people might want to do so (e.g., the referee).

21. *Spacing of exponents*. Now and then, depending on the shape of specific characters, exponents come out too close to the exponentiated symbol, e.g., ν^β. Space can be added, e.g., `$\nu^{\,\beta}$`, giving $\nu^{\,\beta}$ or (better) `$\nu^{\hbox{\hglue 0.7pt}\beta}$`, giving $\nu^{\hbox{\hglue 0.7pt}\beta}$, which makes it easy to "tune" the space.

22. *Thousands separator*. The SI standard is to use spaces (1 000 000) rather than commas (1,000,000) to separate thousands. Thin spaces (`\,`) should be used for integers of more than four digits, giving 1 000 000. *Never* simply type a space in the input file (`10 000`), as that would allow a line break in the middle of the number (and give the wrong spacing).

23. *Writing "σ"*. Write `$5\,\sigma$` ($5\,\sigma$) or possibly `$5\sigma$` (5σ), but never `5-$\sigma$` (5-σ), and *especially* never `$5-\sigma$` ($5-\sigma$). But as mentioned before, the use of σ to denote confidence intervals should be avoided as much as possible.

24. *Fractions*. Fractions of fractions often yield very small fonts; if the variables occurring in addition have subscripts, the resulting LaTeX output may be very difficult to read – that should be avoided. Make sure that the resulting equations are easily readable on output. Furthermore, avoid fractions in the text, so instead of $\frac{(a+b)}{(c+d)}$, it is better to write $(a+b)(c+d)^{-1}$; this of course does not apply to equations in display mode.

25. *Precision of values and errors*. If you quote a value for a quantity and its uncertainty, make sure that they match. For example, a statement like $x = 1.20405 \pm 0.012$ makes no sense – since digits in the estimate are quoted that are, according to the error, totally irrelevant. In this case, the proper statement would be $x = 1.204 \pm 0.012$. In general, excessive numbers of digits should not be given. The number of digits used for a quantity should be driven by the uncertainty on that quantity; in many cases a single digit on uncertainties is sufficient. We will follow the specific policy of the Particle Data Group[4] which says: "The basic rule states that if the three highest-order digits of the error lie between 100 and 354, we round to two significant digits. If they lie between 355 and 949, we round to one significant digit. Finally, if they lie between 950 and 999, we round up to 1000 and keep two significant digits. In all cases, the central value is given with a precision that matches that of the error. So, for example, the result 0.827 ± 0.119 would appear as 0.83 ± 0.12, while 0.827 ± 0.367 would turn into 0.8 ± 0.4." There may be particular circumstances in which deviations from this general rule may be justified, for example when comparing error estimates from two different pipelines, or when the error budget from several components are analyzed.

26. *Ions*. To denote an ion, use small capitals to denote the ionization state, e.g., CIV for three times ionized carbon, written as `C{\sc iv}` or as `\ion{C}{iv}`.

27. *Definitions*. In order to define a new quantity, such as

$$\tau_{\rm F}(\boldsymbol{\theta};\boldsymbol{\beta}) := \frac{1}{2}(\boldsymbol{\theta}-\boldsymbol{\beta})^2 - \psi(\boldsymbol{\theta}) \;,$$

use the ":=" (`:=`) operator. The newly defined function is on the left-hand (colon) side of the := operator, and its definition on the right-hand (equality) side. One can also use the inversely-ordered operator "=:" (`=:`), as in

$$\theta_{\rm E} = 4\pi\,\frac{\sigma_v^2}{c^2}\,\frac{D(z_1,z_2)}{D(z_2)} =: 4\pi\,\frac{\sigma_v^2}{c^2}\,\beta(z_1,z_2) \;,$$

where it is clear that $\beta(z_1,z_2)$ gets defined here. Hence, the use of ":=" and "=:" avoids any ambiguity about which quantity gets defined. The operator "≡" (`\equiv`) should

[4] http://pdg.lbl.gov/2013/reviews/rpp2013-rev-rpp-intro.pdf

be reserved for identities; an example would be the reduced deflection angle for a singular isothermal sphere, $|\boldsymbol{\alpha}(\boldsymbol{\theta})| \equiv \theta_{\rm E}$, or that for a Minkowski spacetime in arbitrary coordinates, $R^{\mu}{}_{\nu\lambda\kappa} \equiv 0$.

28. *Similar looking symbols*. Using two symbols that look rather similar may confuse the reader, and should either be avoided or explicitly explained. Examples are ϵ and ε, or ρ and ϱ (`$\epsilon$`, `$\varepsilon$`, `$\rho$`, and `$\varrho$`, respectively). If such a pair of symbols is used in the same paper, it should be pointed out; e.g., "whereas ϵ as defined in Eq. (13) is the raw ellipticity, we denote with ε its PSF-corrected version".

29. *Angular wavenumber*. The angular wavenumber should be written as ℓ (`\ell`) not lowercase l. In fact, this letter should never be used as an algebraic variable, since l is too similar in appearance to the number 1.

30. *Plural of photo-z*. The plural of photo-z is photo-zs, not photo-z's or similar constructions.

31. *Ranges*. There are various valid way of denoting ranges. Examples are $0.5 \leq z \leq 1$, $z \in [0.5, 1]$, or $z = 0.5$–1. Invalid ways to indicate ranges include $z = 0.5$-1 and $z = 0.5-1$ (the latter yielding $z = -0.5$).

2.5 References

1. *Using BibTEX*. Make sure that the reference list contains all the references cited in the text. Ordering of references in the reference list will be taken care of by BibTEX; we strongly advise the use of BibTEX for your papers. However, the BibTEX entries obtained from ADS do not always yield the correct format for references – you need to check them carefully! In particular, ADS+BibTEX may omit the arXiv preprint number, which is not acceptable, and has to be corrected by editing the corresponding `.bib` file entry. Furthermore, there are frequent problems with references from books and conference proceedings, so that these BibTEX entries often need to be edited by hand.

2. *Reference to unpublished work*. Papers in preparation (lacking a journal or arXiv reference) should not appear in the bibliography. They should be quoted as "in prep." in the main text, without any date. Private communications should similarly be acknowledged as "YYYY, priv. comm." in the main text. But such references should be used rarely, since they concern material that a typical reader cannot access in order to check details; the same applies to papers which are submitted to a journal, but are not on the arXiv. Reference to not publicly available literature should be avoided in case the corresponding information is central for the present paper.

   The main situation in which referencing of this kind will be needed is if a set of related papers are all submitted to a journal simultaneously – although in that case special arrangements should be made to ensure that the referee of one paper can access the entire set. When posting the set to the arXiv, the initial posting will allocate an arXiv number, and then all submissions should be replaced to substitute the arXiv reference for "in prep.".

3. *Parentheses in citations*. Details on citations and formats of references are slightly different between different journals; please follow the corresponding instructions for authors.

Regarding citations, avoid placing parentheses within parentheses, e.g., use "It was shown by Einstein (1916) that ..." or "It is well known (see, e.g., Einstein 1916, and references therein) that ...," but not "It is well known (see, e.g., Einstein (1916), and references therein) that ..."

4. *Reference list*. Where reference conventions are numerical, it is good practice to try to write so that the anonymity of a reference is softened. So instead of "as shown in [42]", write "as shown by Author et al. [42]".

5. *References to arXiv papers*. These should be of the form "Personone, A. & Persontwo, B. 2020, arXiv:2013.12345", instead of "Personone, A. & Persontwo, B. 2020, arXiv e-prints, arXiv:2013.12345", since the former is shorter and contains the same information. This may require that the BibTEX entry is edited.

6. *Citations and references to Euclid Key Project papers*. The author list of Key Project papers should start as[5] "Euclid Collaboration: F. Author, S. Writer, T. Plotter, ...". Correspondingly, a citation to such a paper should have the form "Euclid Collaboration: Author et al. (2019)", and in the reference list it should appear as "Euclid Collaboration: Author, F., Writer, S., Plotter, T. et al. 2019, A&A, 931, A885". This can be achieved by editing the author entry in the `.bib` file to look like this:

```
author = {{Euclid Collaboration: Author}, F. and {Writer}, S. and
         {Plotter}, T., and ...}
```

7. *Check your final reference list carefully*. You should not assume that BibTEX generates a flawless result from your `.bib` file. You may need to edit the `.bib` file by hand. The most frequently occurring issues are the following. (i) Inconsistency of journal naming, e.g., ApJ, Astrophys. J., and The Astrophysical Journal; only one of these should appear, preferentially the first one. (ii) Multiple occurrences of the same paper. This happens when the .bib file contains the same paper multiple times with different labels. (iii) Special fonts within arXiv references, like `[arXiv:2012.12345]`, should be avoided. (iv) Inconsistencies in the number of explicitly listed authors, where for some papers, the first three authors are listed before the "et al.", while in other cases only one author is given. (v) For some proceedings papers, only the first page is listed, but for others the first and last pages are given; the former case is preferred. (vi) Incomplete references, e.g., the editors and/or publishers of conference proceedings are not given, or other information that enables a unique identification of the reference is missing.

2.6 Figures

The standard of quality for figures in *Euclid* publications should be as high as possible. Many colleagues will not read the full paper in detail, but may take a look at its figures. Therefore, figures should be clear and accurate, in sharp focus, with clear numbers and letters.

[5] The reasons for this choice are as follows. A citation like "Euclid Collaboration et al. (2022)" makes no sense logically because most of the 'et al.' will be members of the Euclid Collaboration. Furthermore, there will be many papers that would be cited as "Euclid Collaboration et al. (2025)"; including the first author's name makes it much easier to identify which paper is meant.

Whereas in the later stages of the *Euclid* project, we may define a set of unified rules for producing figures (so that their style is comparable between different *Euclid* publications), some more general rules can be set right away.

1. *Make sure that the figure can be properly read.* This concerns several issues. The lettering, e.g., axis labels, should be sufficiently large; as a general rule, capital letters should have a height of about 2 mm (when the figure is scaled to the size it will appear in the journal). Alternatively, aim to have your axis labels and other text be of about the same size as the text in the figure caption. In line plots, if there are multiple curves, they should be easily distinguishable from each other. Lines and symbols should be described within the figure (and often also in the caption); in general, a graphical legend in the figure, or labelling curves individually, is better than lengthy descriptions of the elements in the caption (avoid "the red dashed-dotted curve ..." or "the blue filled inverted triangle ..." in the caption as the sole description for curves and symbols whenever possible).

2. *Line colour and thickness*. If you use colour figures, avoid curves in yellow, cyan, or other colours that too easily disappear into invisibility when the figure is printed or displayed with an average projector for presentations.[6] Also, avoid inventing 'fancy' colours. You may also want to select your colour combinations considering people who are colour-blind.[7] A common mistake is to choose the thickness of lines to be too thin (or, if no explicit choice of line thickness is made, to ignore the fact that your plotting program produces lines with insufficient thickness). Pay special attention to this issue and use your judgement to obtain a reasonable line thickness.

3. *Axes*. The figure should be enclosed in a frame on all four sides, labelled with tick marks, numerical values, and axis labels. Font size and line thickness are relevant here as well; e.g., the thickness of lines should match with that of the frame. Text labels should not overlap. Make sure that there are at least two numbered tick marks on each axis, but preferably more. Numerical values should be oriented parallel to the axes, particularly for multi-panel figures.[8]

4. *Anisotropic scaling*. *Do not* scale the height and width of a figure independently to make it fit into a particular space in a paper (or a presentation). The geometrical distortion due to anisotropic scaling is *unacceptable*.

5. *Plots with similar quantities on both axes*. If the two axes of a figure show comparable quantities (e.g., the two components of the complex ellipticity, or spectroscopic versus photometric redshift), the scaling of the two axes should be the same. In such cases, the figure should in general be square if the ranges of values are the same on both axes.

[6] Often, it is a good idea to make plots with large labels specifically for talks – but such plots should be kept separate and not be used in printed papers.

[7] We point to the website `https://personal.sron.nl/~pault/`, which has a technical note on colours to use for colour-blind readers and has code for IDL, gnuplot, and python.

[8] The reason is straightforward. If the numerical values on the vertical axis are perpendicular to the axis, the space they take up horizontally depends on the numbers. The figure frame size then depends on the numerical values on the axis. Figure frames that should be exactly the same size will not be. Individual images in composites will vary in size, and be impossible to align. The solution, fortunately, is simple: run the numbers parallel to the axis.

6. *Multi-panel figures*. In multi-panel figures, try to identify the different panels by proper labelling inside the panels, instead of only describing in the caption that "the middle panel in the second row corresponds to a wCDM model with $w = -0.9$ ...". Use labels "(a)", "(b)", ... when necessary. When describing different panels in the caption, identify them as "*Left*:...", "*Lower right*: ...", etc., typing `\emph{Left}:` .... Please note that the colon is outside the brackets.

7. *Axis labels*. Label axes with the name or description of the quantity plotted (possibly a symbol) and units if applicable, e.g., Separation θ/arcmin, or Multipole order ℓ. If logarithms are involved, use $\log_{10}$(Separation θ/arcmin). In labels, as elsewhere, use exponents, not fractions in units: $\mathrm{km\,s^{-1}}$, not km/s. Do not use a dot, but a space to separate units ($\mathrm{K\,km\,s^{-1}}$, not $\mathrm{K{\cdot}km\,s^{-1}}$). Capitalize labels as normal text (first letter and proper names only). Variables as labels are best obtained by direct import of LaTeX symbols by the plotting software. A common alternative convention to the SI treatment of units via division is to use square brackets. One might therefore label an axis either r/Mpc or r [Mpc]. But it is best to use a single convention throughout a paper rather than mixing them. And avoid the common error of ambiguous multiplicative factors, such as r [$*10^3$Mpc].

8. *Consistency of style*. Within a given paper, the style of the figures should be consistent. Thus, it is highly recommended to produce all figures with the same plotting software. It is most annoying when figures that appear on the same page are of dramatically different style – that looks amateurish and is inappropriate for a big team like the Euclid Collaboration.

9. *Scaling and size of figures*. Each figure should be designed for its final size as it will appear in the journal. Simply rescaling a figure to fit will in general yield wrong font sizes and line widths.

10. *File formats*. Use graphics software that produces scaleable, vector-graphic output, such as EPS, PDF, or SVG. Do not use bitmap formats (e.g., PNG, JPEG) except for photographs or images without annotation. If an image needs to be annotated, the bitmap should be embedded in a vector format such as PDF. Never convert the annotation to a bitmap format. If it is impossible to use a scalable vector format, then use a non-lossy, high-resolution ($> 300\,\mathrm{pixels\,inch^{-1}}$) bitmap format such as TIFF. Do not use JPEG, since it will blur the annotation.

11. *File sizes*. Giant files are awkward to deal with, and may make submission to the journal and the arXiv difficult. There is no specific limit to the number of MB in any particular file, but general guidelines are: not to use more pixels per inch than needed in images; and to apply (modest) JPEG compression if necessary (but do not apply JPEG compression to line drawings or to the annotation in images). As a specific example, it is not possible to represent all the information in an all-sky `HEALPix` $N_{\mathrm{side}} = 2048$ image in a journal figure, so you shouldn't try. It may be a good idea to smooth images before downsampling them. Note also that PostScript is an inefficient format for figures; conversion to PDF will usually reduce the file size (without loss) quite effectively.

12. *Bounding Boxes*. Too often, plots are produced with excessive white space around them. This can be removed by directly editing the BoundingBox (EPS) or MediaBox (PDF) values, or by controlling offsets in `includegraphics` in the LaTeX source. Visual cropping

of figures is not a good solution as it is hard to perform consistently: if you have several plots to be displayed as part of a single figure, they usually need to have identical amounts of white space in order to achieve proper alignment.

13. *Tick marks and numeric labels*. Have tick marks projecting out of the frame only if it is necessary to make them visible. Use sensible (rational) tick separations. Choose units to get numbers without big exponents. Avoid overlapping labels. Do not use more significant figures than are needed in labels (i.e., 10, not 10.00 or 9.999). It is not necessary to have the same number of decimal places in axis labels. For example, `0.01, 0.1, 1, 10, 100` is better than `0.01, 0.10, 1.00, 10.00, 100.00`. Avoid unnecessary trailing zeros. Additionally, it is better to write 1, 10, 100 than 10^0, 10^1, 10^2.

14. *Lettering in figures*. Lettering should be in lower-case type, with the first letter capitalized and no full stop. Layering type directly over shaded or textured areas and using reversed type (white lettering on a coloured background) should be avoided where possible.

15. *Consistency of style and colour across figures*. Use a uniform style for figures throughout the paper. If a quantity is represented by a red dashed line in one figure, use the same style for it in other related figures.

2.7 Active links

To include active links in the output `.pdf` file, include `\usepackage{url}` at the beginning of the LaTeX file and then use `\url{}`, e.g.,
`\footnote{\url{http://www.asdc.asi.it/fermibsl/}}` yielding[9].

3 *Euclid* specifics

3.1 The `euclid.sty` file

The `euclid.sty` file provides a number of useful macros, some of which are listed in the following Tables 1, 2, and 3. Later versions of this document (and of the `euclid.sty` file) will probably contain a more extensive list of macros, as we learn what things are frequently used.

The `euclid.sty` file is available at

http://ECEB.astro.uni-bonn.de .

To use the file within your LaTeX documents, you need to include it as a package via `\usepackage{euclid}` in the preamble of your document.

3.2 *Euclid*-specific acknowledgements

In *Euclid* publications, proper acknowledgement of ESA and the national agencies *must* be given. These are detailed in the EC Publication Policy Document. For convenience, the `euclid.sty` file contains a number of macros for this. For example, to obtain

[9] http://www.asdc.asi.it/fermibsl/

Table 1: Definitions that work in both math mode and normal mode. For the units defined in the third block, note that the correct spacing between the numerical value and the unit is already included.

Input	Output in math mode	Output in normal mode
`\Ltwo`	L_2	L_2
`X\inv`	X^{-1}	X^{-1}
`r\superscr{gal}`	r^{gal}	$\mathrm{r}^{\mathrm{gal}}$
`5.3\expo{11}`	5.3×10^{11}	$5.3{\times}10^{11}$
`\dots`	$\ldots$	$\ldots$
`\ang{2;;}`	2°	2°
`\ang{2.4;;}`	$2\overset{\circ}{.}4$	$2\overset{\circ}{.}4$
`\ang{;3;}`	$3'$	$3'$
`\ang{;3.5;}`	$3\overset{'}{.}5$	$3\overset{'}{.}5$
`\ang{;;7}`	$7''$	$7''$
`\ang{;;7.2}`	$7\overset{''}{.}2$	$7\overset{''}{.}2$
`\ra{12;16;23.45}`	$12^\mathrm{h}\,16^\mathrm{m}\,23\overset{\mathrm{s}}{.}45$	$12^\mathrm{h}\,16^\mathrm{m}\,23\overset{\mathrm{s}}{.}45$
`\ra{12;16;}`	$12^\mathrm{h}\,16^\mathrm{m}$	$12^\mathrm{h}\,16^\mathrm{m}$
`\ang{-23;14;12.38}`	$-23^\circ\,14'\,12\overset{''}{.}38$	$-23^\circ\,14'\,12\overset{''}{.}38$
`\ang{-23;14;12}`	$-23^\circ\,14'\,12''$	$-23^\circ\,14'\,12''$
`7\,\micron`	$7\,\mu\mathrm{m}$	$7\,\mu\mathrm{m}$
`10\,\kms`	$10\,\mathrm{km\,s^{-1}}$	$10\,\mathrm{km\,s^{-1}}$
`68\,\kmsMpc`	$68\,\mathrm{km\,s^{-1}\,Mpc^{-1}}$	$68\,\mathrm{km\,s^{-1}\,Mpc^{-1}}$
`7.3\,\hMpc`	$7.3\,h^{-1}\,\mathrm{Mpc}$	$7.3\,h^{-1}\,\mathrm{Mpc}$

Table 2: TEX definitions, where the input is in math mode.

Input	Output
`a\simprop b`	$a \propto\!\!\!\sim\, b$
`\paren{\frac{a}{b}}`	$\left(\frac{a}{b}\right)$
`\brackets{\frac{a}{b}}`	$\left[\frac{a}{b}\right]$
`\curly{\frac{a}{b}}`	$\left\{\frac{a}{b}\right\}$
`\ave{\frac{a}{b}}`	$\left\langle\frac{a}{b}\right\rangle$
`\abs{\frac{a}{b}}`	$\left\lvert\frac{a}{b}\right\rvert$
`\vec{x}`	$\boldsymbol{x}$
`\tens{A}`	A

Table 3: Macros for abbreviations of frequently used LaTeX commands.

Macros	Original
\ba	\begin{align}
\ea	\end{align}
\be	\begin{equation}
\ee	\end{equation}
\bea	\begin{eqnarray}
\eea	\end{eqnarray}
\bc	\begin{center}
\ec	\end{center}
\bfig	\begin{figure}
\bfigs	\begin{figure}\sidecaption
\efig	\end{figure}
\bi	\begin{itemize}
\ei	\end{itemize}
\ben	\begin{enumerate}
\een	\end{enumerate}
\bd	\begin{description}
\ed	\end{description}
\diff	{\rm d}

> "We thank XXX for providing YYY, as well as an anonymous referee for constructive comments. The Euclid Consortium acknowledges the European Space Agency and a number of agencies and institutes that have supported the development of *Euclid*, in particular the Academy of Finland, the Agenzia Spaziale Italiana, the Belgian Science Policy, the Canadian Euclid Consortium, the French Centre National d'Etudes Spatiales, the Deutsches Zentrum für Luft- und Raumfahrt, the Danish Space Research Institute, the Fundação para a Ciência e a Tecnologia, the Ministerio de Ciencia e Innovación, the National Aeronautics and Space Administration, the National Astronomical Observatory of Japan, the Netherlandse Onderzoekschool Voor Astronomie, the Norwegian Space Agency, the Romanian Space Agency, the State Secretariat for Education, Research and Innovation (SERI) at the Swiss Space Office (SSO), and the United Kingdom Space Agency. A complete and detailed list is available on the *Euclid* web site (`http://www.euclid-ec.org`)."

it is sufficient to type `We thank XXX for providing YYY, as well as an anonymous referee for constructive comments. \AckEC`. Please note that this version of the acknowledgement should be included in all EC publications.

Non-EC publications using data, products, software, or other material produced and provided by the Euclid Consortium should include the text "The authors acknowledge the Euclid Consortium, the European Space Agency and the support ...", obtained with `\AckECon`. Similarly, when data, products, software, or other material produced and provided by the Euclid Collaboration are used, the acknowledgement should include "The authors acknowledge the Euclid Collaboration, the European Space Agency and the support ...", obtained by `\AckECol`.

Note that the precise wording of the acknowledgement may change as the project evolves. These changes will be immediately implemented in the `euclid.sty` file and also posted on the ECEB website. Therefore, please make sure to use the latest version of the `euclid.sty` file.

3.3 The *Euclid* photometric system

The data products from *Euclid* will serve as a standard for decades to come. The wavelength dependence of the photometric passbands of the two instruments is unique, and to distinguish them from that of other ground- or space-based instruments, they should be denoted by a unique notation. The photometric band of the VIS instrument will therefore be termed $I_{\rm E}$, and those of the NISP instrument by $Y_{\rm E}$, $J_{\rm E}$, and $H_{\rm E}$. There are obtained by the macros `\IE`, `\YE`, `\JE`, and `\HE`, respectively, which give the same result inside and outside math mode. If these bands needs to be referred to in ascii tables or in other situations where subscripts are not possible, e.g., in online catalogues, the notation IE, YE, JE, and HE will make them still uniquely identifiable.

3.4 Reference to *Euclid* and other projects

Refer to "the *Euclid* project", "the *Euclid* spacecraft", or "*Euclid*". The name should be italicized. This can be done in all font environments (e.g., normal text, bold titles, or section headings) with `\textit{Euclid}`. `\Euclid` is so defined in `euclid.sty` for convenience. However, "Euclid" is not in italics in references that include the phrases "Euclid Consortium" or "Euclid Collaboration". By the same logic, "Euclid" is not italicized in other proper noun phrases, such as "Euclid Catalogue of Galaxy Clusters", "Euclid Survey", or "Euclid Deep Fields".

For other projects, corresponding rules apply. A satellite name is *not* italicized unless it is named after a person, so it is "*Planck*", "*Chandra*", "*Fermi*", "*Herschel*", and "*Spitzer* Space Telescope", but "Gaia", "GALEX", "IRAS", and "ISO". The names of instruments and non-satellite experiments remain in roman font, e.g., "ACS", "WFC3", "SPIRE", "VLT", and "DES". Note that the convention means that you should write "*Hubble* Space Telescope" (`\HST`), "*Wilkinson* Microwave Anisotropy Probe" (`\WMAP`), *Spitzer* Space Telescope (`\Spitzer`), and "XMM-*Newton*" (`\XMMN`), but just "HST", "WMAP", and "XMM".

The possessive version of *Euclid* is "*Euclid*'s", written `{\it Euclid\/}'s` or `\Euclid's`. Note that the apostrophe and the "s" are roman, and that the italic correction is built into the definition of `\Euclid`, so you do not have to worry about spacing. [10]

[10] The italic correction takes into account proper the spacing when changing from italics, or slanted, into roman fonts. To see the difference, compare "*Euclid*" with "*Euclid*", the former obtain by ``*Euclid*'', the latter with including the italic correction, ``*Euclid*'' – one sees the difference in the spacings between the word and the quotation marks. In most cases, you can achieve the same results when using ``*Euclid*'', yielding "*Euclid*".

Appendices

A The siunitx package to typeset numbers and units

Typesetting values with units correctly is a tedious but important (and often overlooked) part of publication writing – see the corresponding sections in this document. The package **siunitx** is a very powerful LaTeX package that provides a consistent syntax to typeset values, ranges, lists, units, tabulated data, and uncertainties. It might be attractive for people who are not yet familiar with all the details and rules of correct number/unit typesetting. We highlight here only some of its features. For a comprehensive manual, please see the well written documentation at http://tug.ctan.org/macros/latex/exptl/siunitx/siunitx.pdf.

A.1 The basic value-unit pair

In **siunitx**, one types a value with a unit using the `\SI` command. This command works in both math-mode and inline with text. In both environments the value and the unit are rendered in the same way. The syntax is fairly self-explanatory. The package supports a very large number of different units and different ways to type them. For beginners, the most intuitive way is to typeset units *literally*, such as `\tera\electronvolt` or `\centi\meter`. For a full list of available units check out the **siunitx** documentation. You can also typeset composite units such as `\centi\meter\per\second` and so on. The package **siunitx** automatically takes care of correct spacing between units; Table 4 gives some examples.

Table 4: Some basic **siunitx**-examples.

LaTeX-input	Text output	Comments
`\SI{8}{\kilo\meter}`	$8\,\mathrm{km}$	simple unit
`\SI{8}{\kilo\meter\per\second}`	$8\,\mathrm{km\,s^{-1}}$	composed unit
`\SI{8}{\kms}`	$8\,\mathrm{km\,s^{-1}}$	you can define abbreviations for often used units
`\SI{8.0e03}{\meter\second}`	$8.0 \times 10^3\,\mathrm{m\,s}$	numbers can be typeset in many different formats (here in raw program output)
`\SI{0.8e05}{\milli\second}`	$0.8 \times 10^5\,\mathrm{ms}$	note the different settings of the units `\meter\second` (last example) and `\milli\second`. The first one requires a small space between `m` and `s`!
`\SI{245.6 +- 10}{\meter\squared}`	$(245.6 \pm 10.0)\,\mathrm{m^2}$	numbers with errors
`\num{123456789}`	123 456 789	long numbers get correct grouping
`\complexnum{1 + 2i}`	$1 + 2\mathrm{i}$	complex numbers
`\si{TeV}`	TeV	units without associated numbers

If you need to render units or values on their own, **siunitx** provides the `\si` and `\num` commands. The latter will typeset large numbers with a delimiter to group digits together to improve readability, as described in the main text. The **siunitx** package also offers possibili-

ties to typeset numbers with errors, ranges of numbers, and so on. Table 4 gives a few examples but you should consult the `siunitx`-documentation for any details.

It should be pointed out that not all features of `siunitx` produce satisfactory results. For example, `\SIrange{2}{10}{\percent}` yields "2 % – 10 %", but that is not the desired form for a range; instead, this should written as "2–10%", i.e., as `2--10\%`. Another example for issues with `siunitx` is `\SIlist{2,9,10}{\cm}`, yielding "2 cm, 9 cm and 10 cm", not really want we want, which is "2, 9, and 10 cm". In any case, you are advised to carefully check that the expected output is produced.

A.2 Euclid unit definitions

For convenience, we defined in the `euclid.sty` file the additional units listed in Table 5.

Table 5: New `siunitx`-unit definitions in `euclid.sty`.

LaTeX-input	Text output	Comments
`\si{\century}`	century	
`\si{\hubble}`	h	Convenient definition for usage of h within units
`\si{\hMpc}`	$h^{-1}\,\mathrm{Mpc}$	
`\si{\kms}`	$\mathrm{km\,s^{-1}}$	
`\si{\micron}`	µm	
`\si{\parsec}`	pc	
`\si{\solarluminosity}`	$L_\odot$	
`\si{\solarmass}`	$M_\odot$	
`\si{\steradian}`	sr	
`\si{\year}`	yr	

B The `glossaries` package for dealing with acronyms

In addition to the macros defined in the `euclid.sty` file, there may be other acronyms that crop up many times in specific *Euclid* papers. One way to define these coherently within the LaTeX is to use the `glossaries` package. This will ensure that the acronym is defined the first time it appears in your paper and is then used consistently throughout the rest of the paper.

The first step is to add `\usepackage{glossaries}` in the preamble of your LaTeX file. This is a powerful and flexible package, which can be used in different ways. One simple option is to add lines of this sort near the start of your LaTeX file:

```
\newacronym{msm}{MSM}{My special method}.
```

Alternatively you could write a separate glossary file (e.g., called `acronyms.tex`), consisting of all your definitions and then that file can be input to your main LaTeX file (using `\input{acronyms}`). When you want to use an acronym in the paper, just write `\gls{msm}`. This will magically give the definition of the acronym the first time it is encountered, i.e., "my special method (MSM)", and will just give the acronym, i.e., "MSM", on subsequent uses.

There are methods for dealing with complicated cases, such as plural acronyms, and also ways to generate a glossary for inclusion in your paper. See this document for more details:

`http://tug.ctan.org/macros/latex/contrib/glossaries/glossariesbegin.pdf`