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http://www.icmp.lviv.ua/journal

CONDENSED MATTER PHYSICS

Regular article

Long title: Template and instructions to the authors*

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These instructions describe how to prepare and submit an article using LaTeX and `cmpj.sty` for publishing in “Condensed Matter Physics” journal. Each submitted manuscript should contain an abstract reflecting the essence of the study. The abstract will be published separately from the article in a variety of bibliographical services so it should be completely self-contained (*no footnotes or numbered references*). Extremely important references may be incorporated into the abstract itself: [Thor A.U. et al., Condens. Matter Phys., 2004, **7**, 111]. The abstract should be written as a single paragraph not exceeding 150 words. Mathematical expressions are discouraged. Please define all nonstandard symbols and abbreviations.

Key words: *Up to six keywords*

PACS: *Up to six PACS numbers*

1. Editorial process: from submission to offprints

This guide is intended to help in preparing LaTeX compuscripts for publication in “Condensed Matter Physics” (hereinafter CMP) journal. We appreciate your effort to follow our style in preparing your article for mutual benefit: speedier publication, greater accuracy and higher quality. Below is a description of the features of CMP style. In addition, you will find some general advice and specific remarks on preparing your compuscripts.

Authors are encouraged to submit their manuscripts electronically, through the Editorial Office at `cmp@icmp.lviv.ua`. Third-party submissions cause excessive problems. Author self-submissions are exceedingly preferred. Please send articles as attachments to e-mail messages. All appropriate files (LaTeX sources and figure files) should be combined into a single archive. However, if the size of files exceeds 5 MB a multi-part archive should be created. Then every part of the archive should be sent separately with a clear description (e.g. “Manuscript of A.U. Thor et al., part 1 of 5” etc.). All information about the submission should be included in the main body of the message. This must include: full name, postal and e-mail addresses, telephone and fax numbers of the corresponding author, the full title of the article, the full list of authors and the full list of files in the attached archive(s).

Please check your article carefully for accuracy, consistency and clarity before submission. Ask someone else (preferably native speaker or person with perfect knowledge of English) to read the manuscript, however satisfied you may be with its quality. Your colleague can often find errors or obscure passages missed by the author.

Compuscripts should be coded in LaTeX 2_ε with the `article` class, preferably using the CMP style available at the journal Web page

`http://www.icmp.lviv.ua/journal/src/cmpj.zip`

Manuscript should be arranged in the following order: title of article, short title of not more than 45 characters, author’s name and affiliation, abstract (up to 150 words), up to six key words and

*“...I wouldn’t stand by and see the rules broken – because right is right, and wrong is wrong, and a body ain’t got no business doing wrong when he ain’t ignorant and knows better.”

Twain M., The Adventures of Huckleberry Finn. 1884.

PACS numbers, text of the article, acknowledgements, appendices and references. At the end of the document or in separate file the contributors are asked to provide title, author's name and institute, abstract and key words in Ukrainian (see subsection 2.9). Figures and tables should be included in the text where they have appeared or at the end of the article.

The Editorial Office acknowledges receipt of a compuscript by e-mail to the corresponding author. All contributions will be evaluated according to the standard procedures of peer review, usually by two referees. Only contributions which meet the scientific and formal standards of the journal can be accepted for publication. The Editorial Office will send an acceptance letter to the corresponding author. Proofs are provided in the form of PDF files after preparing an article for publishing by the production department. Authors should prepare a list of necessary corrections as soon as possible and e-mail it to the Editorial Office. All articles are freely available in electronic forms (PS, PDF) at the journal Web page:

`http://www.icmp.lviv.ua/journal/`

We look forward to receiving your articles!

2. Style guide

2.1. Title information

The manuscript should begin with the title of the paper in lower case letters except for proper nouns, certain abbreviations, physical quantities, chemical symbols etc. The use of nonstandard abbreviations and acronyms is not allowed. Unnecessary words in the title should be dropped. The title is followed by the names of all authors (with first name initials) and the corresponding institutions (from the smallest to the largest unit, e.g. group, department, university) with addresses, as given in the above example (street or P.O. box, city with zip codes, country). Countries should be written in English. There are two slightly different forms of affiliations in the CMP style depending on whether all authors work in the same institution. The corresponding author electronic mail address and optionally phone and fax numbers can be placed in a footnote. Dates of receipt of original and revised versions will be added by the Editorial Office.

An abstract should accompany each manuscript; it should be completely self-contained, not exceeding 150 words and written as a single paragraph. Mathematical expressions should be avoided.

Up to six keywords should at a glance give a general idea of the article to a reader. PACS numbers (up to six classification codes) *must* be given. Please use the full, permanently updated classification system which is available online at

`http://publish.aps.org/PACS/`

There should be no more than six numbers, the principal number should be placed first, and the check characters should always be included.

2.2. Main body of the paper

The CMP style makes use of the conventional LaTeX document layout so below we will only point out peculiarities of the style and some important general features (see also section 3 for TeX-related issues).

The body of the paper should be divided into sections, subsections etc. (however, in short papers sections may not be necessary) using standard LaTeX commands. Text should be typed as usual. Compounded words like "semi-infinite, a-axis" are separated by a short hyphen "`-`", the en-dash "`--`" is used in number ranges (12–21) and em-dash "`---`" — in sentences. Please, make a difference between left and right quotes (`‘` vs. `’` or `‘‘` vs. `’’`, respectively) instead of using the symbol `"` everywhere. *Emphasized text* is obtained with the command `\emph{...}`. Extra or exceptional hyphenations are added by means of the command `\hyphenation`, which should be placed in the preamble of the document.

Use `\label` and `\ref` for cross-references to equations, figures, tables, sections, subsections, etc., instead of plain numbers. The `\label` instruction should be typed immediately after (or one line below), but not inside the argument of a number-generating instruction such as `\section` or

`\caption`, roughly in the position where the number appears, in environments such as `equation`, `figure`, `table`, etc.

A limited number of private definitions should be placed in the preamble of the article, and not at any other place in the document. Such private definitions, i.e. definitions made using the commands `\newcommand` and `\newenvironment`, should be used with great care. Large macro packages should be avoided. Definitions that are not used in the article should be omitted. Do not change existing environments, commands and other standard parts of LaTeX. A short description of the various definitions, in the form of TeX comment lines, is appreciated. Deviation from these rules may cause inaccuracies in the article or a delay in publication.

Footnotes should be avoided whenever possible. If required they should be used only for brief notes that do not fit conveniently into the text. The standard LaTeX macro `\footnote` should be used and will normally give an appropriate symbol.

Your article will be read by many people whose native language is not English so keep sentences as short and simple as possible. UK English spellings are preferred (colour, flavour, behaviour, tunnelling, artefact, focused, focusing, fibre, etc.). Using of "-ize" spellings is encouraged (diagonalize, renormalization, minimization, etc.). The words "table", "figure", "equation" and "reference" should be written in full and *not* contracted to "Tab.", "Fig.", "eq." and "Ref."

2.3. Mathematical material

2.3.1. General advice

For in-line formulas use `\(...\)` or `$...$`: E_{F}, $T_{\mathrm{C}} = 123$ K. Avoid built-up constructions, for example fractions, matrices, integrals, sums, etc., in in-line formulas. For unnumbered displayed one-line formulas use the `displaymath` environment or the shorthand notation `\[...\]`. For numbered displayed one-line formulas use the equation environment. Do *not* use `$$...$$`, but only the LaTeX environments, so that the document style determines the formula layout. For example, the definition of Dirac δ-function in the Fourier representation looks like

$$\delta(x) = \frac{1}{2\pi} \int\limits_{-\infty}^{\infty} \mathrm{e}^{\mathrm{i}sx} \mathrm{d}s, \tag{2.1}$$

where the expression $\mathrm{e}^{\mathrm{i}sx}$ is tolerable but the exponents with more complex arguments should be replaced by $\exp(\mathrm{i}sx)$. For displayed multi-line formulas use the standard `eqnarray` environment or `align` one of the $\mathcal{AMS}$-LaTeX bundle. For example,

$$\begin{aligned} \Delta^{(+)} &\equiv 1 - \Theta(\varphi_1^{(+)} Q_{11} + \varphi_4^{(+)} Q_{22}) - \Theta(\varphi_2^{(+)} + \varphi_3^{(+)}) Q_{12} \\ &\quad + \Theta^2 (Q_{11} Q_{22} - Q_{12}^2)(\varphi_1^{(+)} \varphi_4^{(+)} - \varphi_2^{(+)} \varphi_3^{(+)}) = 0. \end{aligned} \tag{2.2}$$

Please note that the equation number stands in the last line of the multi-line mathematical expression numbered as a whole.

Keep in mind that an *empty* line in TeX sources starts a *new* paragraph! So do *not* separate mathematical environments (and other too!) by empty lines unless you do *want* start a paragraph at this place!

2.3.2. Roman vs. italic

In mathematics mode LaTeX automatically sets variables in a math italic font. Such an italicization should be accepted in general. However, there are some cases where it is better to use a Roman font to mark a special meaning of certain symbols: the Euler number "e", "i" when used as imaginary unit ($\mathrm{i} = \sqrt{-1}$), differential "d", and the operators "Im" and "Re" for the imaginary and real parts of complex numbers, respectively (see equation (2.1) for example) and `cmpj.sty` provides commands `\re`, `\ri`, `\rd`, `\Im`, and `\Re` for typesetting such symbols, respectively.

Mathematical functions, such as `cos`, `sin`, etc., should appear in Roman type. LaTeX provides built-in commands for most of these functions (e.g. `\cos` and `\sin`, respectively).

Subscripts and superscripts should be in Roman type if they are labels rather than variables or characters that take values: k_B (Boltzmann constant), E_F (Fermi energy), T_C (Curie temperature) and c_ion (ion concentration).

Units (e.g. V/cm or V cm^{-1}, K, Pa, etc.) should be written in text mode (not in math environment) with a nonbreakable space to the number before: $T_\mathrm{C} = 123$ K. Symbols of chemical elements are also typed in text mode: H_2O, Ca^{2+}, $^{14}N_2$, etc.

2.4. A few miscellaneous remarks

Mathematical expressions are rather sophisticated object to type out. Below there is a list of the most simple and most common errors which one should avoid.

- For simple fractions in the text the solidus `/`, as in $\hbar = h/2\pi$, should be used instead of `\frac` or `\over`, care being taken to use parentheses where necessary to avoid ambiguity, for example to distinguish between $1/(n-1)$ and $1/n-1$. Exceptions to this are the proper fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{3}{4}$, etc., which are better left in this form. In displayed equations horizontal lines are preferable to solidi provided the equation is kept within a height of two lines. A two-line solidus should be avoided where possible; the construction $(\ldots)^{-1}$ should be used instead.

- Angle brackets (e.g. the "bra-ket" notation, average values and Green functions) are obtained with `\langle` and `\rangle` commands: $\langle p|q\rangle$, $\langle S^z\rangle$ and $\langle\langle a_i^+|a_j\rangle\rangle_\omega$.

- The symbol `\mid` should be used as binary operator only. The character " | " is a proper element of such mathematical constructions as modulus, the "bra-ket" notation and Green functions: $X^{pq} = |p\rangle\langle q|$ and $A = |b/c|$.

- The root sign $\sqrt[n]{x}$ looks fine with simple expressions only, the power $1/n$ should be used for complex ones.

- Braces, brackets and parentheses should be used in the following order: $\{[(\ )]\}$. The same ordering of brackets should be used within each size. However, this ordering can be ignored if the brackets have a special meaning.

- Decimal point (not comma!) should be used in decimal fractions.

- Please treat mathematics as a part of text, writing down punctuation marks where necessary.

2.5. Floats: figures and tables

Put the tables and figures in the text with the `table` and `figure` environments, and position them near the first reference of the table or the figure. Each table or figure should have an explanatory caption which should be as concise as possible. If a table or figure is divided into parts these should be labelled (a), (b), (c), etc., but there should be only one caption for the whole float, not separate ones for each part. The caption comes *before* the table and *after* the figure. It should have a full stop at the end. Simple samples are presented here (see figures 1 and 2 and table 1).

Where possible tables should not be broken over pages. If a table has related notes these

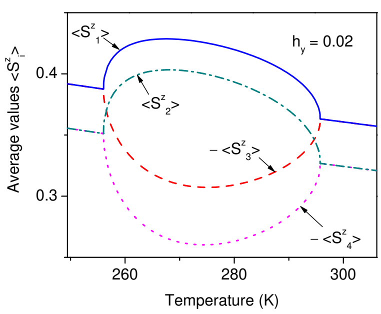

Figure 1. This is a sample of true EPS figure which allows arbitrary scaling without the loss of quality. Figure should be centred in the line.

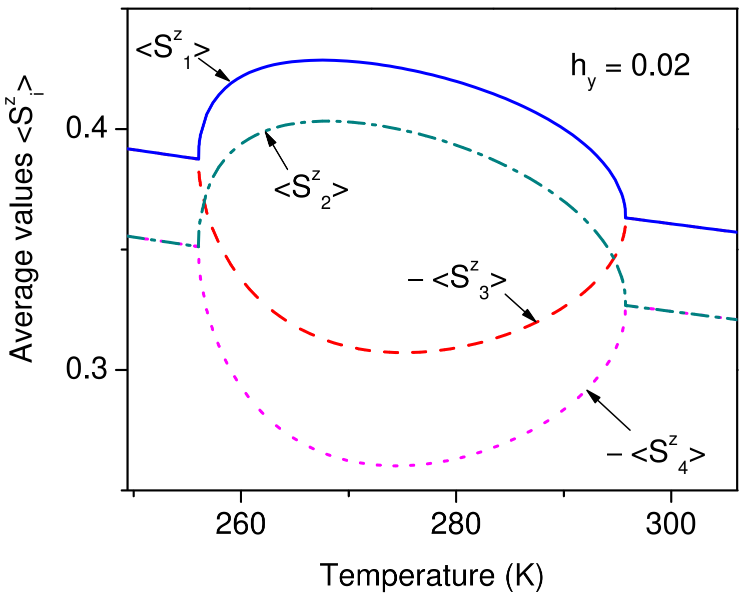

Figure 2. This is a sample of true EPS figure which allows arbitrary scaling without the loss of quality. Figure should be centred in the line.

should appear directly below the table rather than at the bottom of the page. Notes can be designated with footnote symbols. The `minipage` environment is useful in this case.

Figures may be included in an article as Encapsulated PostScript (EPS) files by means of the `\includegraphics` command or using the LaTeX picture environment. Each figure should have a brief caption describing it and, if necessary, interpreting the various lines and symbols on the figure. As much lettering as possible should be removed from the figure itself and included in the caption.

Keep in mind that your tables and figures may move from their original places during preparation of the article for publishing. Collecting all tables and figures at the end of the article is acceptable but undesirable.

Table 1. Coefficients of symmetrized occupancies of orientational states which correspond to irreducible representations of the point symmetry group 2/m. Just a sample. Table also should be centred in the line.

		(1,1)	(1,2)	(1,3)	(1,4)	(2,1)	(2,2)	(2,3)	(2,4)
A_g	x_+	1/2	1/2	0	0	1/2	1/2	0	0
	z_+	0	0	1/2	1/2	0	0	1/2	1/2
B_g	x_-	1/2	1/2	0	0	−1/2	−1/2	0	0
	z_-	0	0	1/2	1/2	0	0	−1/2	−1/2
B_u	y_+	1/2	−1/2	0	0	1/2	−1/2	0	0
	u_-	0	0	1/2	−1/2	0	0	−1/2	1/2
A_u	y_-	1/2	−1/2	0	0	−1/2	1/2	0	0
	u_+	0	0	1/2	−1/2	0	0	1/2	−1/2

2.6. How to prepare a good figure

Authors should remember that the final printed quality of illustrations can never be better than the quality of the original artwork.

Figures must be carefully prepared and submitted ready for reproduction. Figures are often reduced to half of their original size so lettering and symbols should be clear and large enough (smallest letters should not be smaller than 2 mm, line strength should be greater than 1 pt). All figure elements should be of proportional sizes and have uniform strength and contrast. Avoid small open symbols, small dots, small decimal points, hairlines, close-dotted or short-dashed lines. Draw a closed axes frame in diagrams with the axis titles (quantity followed by the unit in brackets) parallel to the corresponding axis, outside the frame. For numbers, use a decimal point instead of a comma. Authors should avoid including any unnecessary text around a figure, such as captions, figure numbers, author or file names. Grey scales in plots and diagrams, which might get difficult to distinguish after reducing, or which often disappear during the printing process, should be avoided. Labelling should be uniform in size throughout all figures. Lettering should not be pasted on to the figures as it may easily become detached as a result of handling.

Colour figures submitted in electronic format will generally remain in colour in the electronic versions of an article at no cost. However, in the paper version of the CMP journal figures are printed in black and white or grayscale.

Figure 3. This is a sample of a bitmap image. This cosy building homes the Institute for Condensed Matter Physics and the CMP Editorial Office too. Photo by Oleh Vorobyov.

Roughly speaking, there are two types of electronic figures: vector graphics and bitmap graphics. A *vector* image is a set of arranged objects: lines, polygons, ellipses, shades, characters, etc. Such an image allows almost arbitrary scaling without loss of quality. Vector images are typically charts, plots, diagrams, etc., produced by various computer software. A *bitmap* image is a two-dimensional array of pixels (PICture'S ELements) or "dots". Continuous tone photographs are their the most widespread samples (like figure 3). Image quality is determined by DPI (Dot Per Inch — a pretty self-explained definition). Below, there are necessary requirements for each type of images.

Vector images are to be prepared in Encapsulated PostScript (EPS) format. The Bounding Box should indicate the area of the figure with a minimum of white space around it and not the dimensions of the page. Please make sure to use only standard fonts (Helvetica or Arial, Times or Times New Roman, Symbol) or include the fonts in the figure file. Authors should avoid using special effects generated by including verbatim PostScript code within the LaTeX file with specials other than the standard figure inclusion ones. Files should be prepared in ASCII format (not binary) with no TIFF preview. If Windows Postscript drivers are used, check that the Postscript option is set to Encapsulated Postscript (EPS).

Bitmap images should be sent in TIFF (or TIF) format. Continuous-tone figures should have at least 300 DPI, line drawings – 600 DPI minimum resolution in final size. Screen or web resolution is *absolutely insufficient* for publication. If authors convert the bitmap image to EPS format and include it in such a form in the compuscript, they should also send an original TIFF version of the image to the Editorial Office.

Use of lossy JPEG (JPG) format (or JPEG compression) is *strictly prohibited* for images with sharp margins (especially line-art) because of large visible artefacts. Continuous-tone images (especially large figures with good resolution) *can* be sent in JPEG format with compression set to "High quality".

Every time if you are in doubt, please feel free consult the Editorial Office and you will receive an advice of our TeXnical Editor.

2.7. Acknowledgements and appendices

The acknowledgement section follows the main body of the paper and precedes any appendixes. This unnumbered section starts with command

`\section*{Acknowledgments}`

Technical detail that it is necessary to include, but that interrupts the flow of the article, may be consigned to an appendix. Any appendixes should be included at the end of the main text of the paper, after the acknowledgements section (if any) but before the reference list. The command `\appendix` is used to signify the start of the appendixes.

2.8. References

References should be numbered sequentially through the text and prepared by means of `\cite` and `\bibitem` commands, linking citations in the text with their entry in the reference list, which is composed within the standard `thebibliography` environment.

When several references occur together in the text `\cite` may be used with multiple labels with commas but no spaces separating them. Thus

`\cite{Zub74,Bus89,Mel00,Mry94,Sta04}`

would give [1–5]. Note that labels are sorted in an ascending order and the groups of consecutive numbers are condensed.

The citation scheme for journals is: Surnames~Initials., Journal Title (according to the standard abbreviations), Year of publication, **Vol.**, starting page (comments: e.g. in Ukrainian, unpublished, private communication). For journals without volume numbers place the issue number instead as in reference [4]. If there are more than four authors, the first one should be listed only, followed by “et al.” For books, the following order is required (skip irrelevant information): Book Authors or Editor[s] (ed[s].), Book Title. edited by Editors, Book Series Vol. No., Publisher, Place, Year. When citing conference proceedings, please add all available data such as title, date, and place of the conference as well as publisher, place, and year of publication.

A typical numerical reference list might be [1–7].

```
\begin{thebibliography}{7}
\bibitem{Zub74} Zubarev~D.N., Nonequilibrium Statistical Thermodynamics,
    Consultants Bureau, New-York, 1974.
\bibitem{Bus89} Bussmann-Holder~A., Simon~A., B\"uttner~H.,
    Phys. Rev. B, 1989, \textbf{39}, No.~1, 207.
\bibitem{Mel00} Melnyk~R., Patsahan~O.,
    Theor. Math. Phys., 2000, \textbf{124}, No.~2, 1145,
    [Teor. Mat. Fiz., 2000, \textbf{124}, No.~2, 339 (in Russian)].
\bibitem{Mry94} Mryglod~I.M., Tokarchuk~M.V.,
    Condens. Matter Phys., 1993, \textbf{3}, 116.
\bibitem{Sta04} Stasyuk~I.V., Mysakovych~T.S.,
    Preprint of the Institute for Condensed Matter Physics, ICMP--04--12U,
    Lviv, 2004, (in Ukrainian).
\bibitem{Shv04} Shvaika~A.M., Vorobyov~O., Freericks~J.K., Devereaux~T.P.,
    Preprint arXiv:cond-mat/0408400, 2004.
\bibitem{Yuk87} Yukhnovkii~I.R., Idzyk~I.M., Kolomiets~V.O.,
    In: Proc. Contributed papers of Conf. on Modern problems of statistical physics,
    Lviv, vol.~2, 1987, 97--102, (in Russian).
\end{thebibliography}
```

2.9. Ukrainian part

If you are not familiar with Ukrainian language, just uncomment two lines before `\ukrainianpart` in the template. The necessary translation will be made by the Editorial Office.

3. LaTeX and related issues

The great advantage of LaTeX over other text processing systems is its ability to handle mathematics to almost any degree of complexity. For this reason it prevails in major publishing houses working in the fields of physics and mathematics. However, even so brilliant tool becomes useless without necessary level of knowledge. A lot of useful (and free) information one can find at "TEX Users Group" web site

http://www.tug.org/

"The Not So Short Introduction to LATEX 2_ε" by Tobias Oetiker is an absolutely necessary book for beginners:

http://ctan.org/tex-archive/info/lshort/

(available in a variety of languages including Ukrainian). Ukrainian TEXnicians will find a plenty of language-specific information at Andrij Shvaika's "TEX & Ukrainian" Web-page

http://ph.icmp.lviv.ua/~ashv/tex/TeXandUkrainian.win.html

Remember, you write LATEX sources not for computers only, but for human beings also! Please make clear and fine codes! Your document should compile without errors. Do the best you can! However, some underfulls (and few small overfulls) warnings are acceptable, since the compuscript will be slightly (?) modified anyway.

Frequently good physicists (especially young scientists) have a little knowledge how to write a good looking article. As comprehensive (and free) tutorials on the subject one can mention "AIP Style Manual"

http://www.aip.org/pubservs/style.html

and "Reviews of Modern Physics Style Guide"

http://rmp.aps.org/files/rmpguide.pdf

Remember: "*Ignorantia non est argumentum*" and "*Scientia potentia est*"!

References

1. Zubarev D.N., Nonequilibrium Statistical Thermodynamics, Consultants Bureau, New-York, 1974.
2. Bussmann-Holder A., Simon A., Büttner H., Phys. Rev. B, 1989, **39**, No. 1, 207.
3. Melnyk R., Patsahan O., Theor. Math. Phys., 2000, **124**, No. 2, 1145, [Teor. Mat. Fiz., 2000, **124**, No. 2, 339 (in Russian)].
4. Mryglod I.M., Tokarchuk M.V., Condens. Matter Phys., 1993, **3**, 116.
5. Stasyuk I.V., Mysakovych T.S., Preprint of the Institute for Condensed Matter Physics, ICMP–04–12U, Lviv, 2004, (in Ukrainian).
6. Shvaika A.M., Vorobyov O., Freericks J.K., Devereaux T.P., Preprint arXiv:cond-mat/0408400, 2004.
7. Yukhnovkii I.R., Idzyk I.M., Kolomiets V.O., In: Proc. Contributed papers of Conf. on Modern problems of statistical physics, Lviv, vol. 2, 1987, 97–102, (in Russian).

Повна назва: Зразок статті та поради авторам

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В цих порадах описано як підготувати та надіслати статтю для публікації у журналі "Condensed Matter Physics" за допомогою LATEX з використанням стилю `cmpj.sty`. Кожен надісланий рукопис повинен містити анотацію, що відображає суть дослідження. Анотація публікуватиметься окремо від статті в різноманітних бібліографічних виданнях, тому вона мусить бути повністю самодостатньою (*без приміток чи нумерованих покликів*). Вельми важливі поклики можна помістити у анотацію [Thor A.U. et al., Condens. Matter Phys., 2004, **7**, 111]. Анотація повинна складатися лише з одного абзацу розміром до 150 слів. Присутність математичних виразів не бажана. Слід давати означення для всіх нестандартних символів та скорочень.

Ключові слова: *До шести ключових слів*