OASYS: A Software for Beamline Simulations and Synchrotron Virtual Experiments

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Abstract. A modern synchrotron beamline requires an important simulation work for its design and optimization using software modelling tools. OASYS (OrAnge SYnchrotron Suite) is an open-source Graphical Environment for optic simulation software used in synchrotron facilities.

The OASYS environment provides not only an intuitive and very-easy-to-use graphical interface, but also high flexibility and rapidity for interactive simulations. It allows to quickly compare multiple beamline configurations in the same workspace.

OASYS integrates in a synergetic way the most powerful calculation engines available. It interfaces widely used simulation tools for X-ray Optics (e.g. SHADOW for ray tracing, and SRW for wave optics completed with new complementary tools. OASYS provides a language to communicate among the different packages by sending and receiving encapsulated data. Python has been chosen as main programming language, because of its universality and popularity in scientific computing. The software Orange, developed at the University of Ljubljana, has been chosen as high level workflow engine that provides the interaction with the user and communication mechanisms. The OASYS platform permits integration of different packages for a complete modelling of a synchrotron virtual experiment, starting from the parameters of the electron beam, calculation of the radiation from magnetic structure, the photon beam transport and optimization by X-ray optics and eventually interaction with sample to obtain instrumental function or study analyzers and detectors.

INTRODUCTION

Do not abbreviate Figure, Equation, etc.; display items are always singular, i.e., Figure 1 and 2. Equations are always singular, i.e., Equation 1 and 2, and should be inserted using the Equation Editor, not as graphics, in the main text. Display items and captions should be inserted after the reference section. Please do not use footnotes in the text, additional information can be added to the reference list.

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FIRST-ORDER HEADING

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Second-Order Heading

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Third-Order Heading

Physical data should be quoted with decimal points and negative exponents (e.g., 25.8 J K^{-1} mol^{-1}), and arranged as follows where possible: mp/bp 20°C; [α]D20 = −13.5 (c = 0.2, acetone) (please also give units for [α] and c, usually deg cm^3 g^{-1} dm^{-1} and g cm^{-3}, respectively); 1H NMR (400 MHz, DMSO-d_6, δ): 7.15 (s, 2H, Ar H), 1.3 (q, J = 8 Hz, 2H; CH_2), 0.9 (t, J = 8 Hz, 3H; CH_3); ^{13}C NMR (100 MHz, $CDCl_3$,): 175.4 (C=O), 156.5 (C4); IR (KBr): ν = 2972 (w), 2907 (w), ..., 1026 (s; ν_{as}(SiOSi)), 971 (ν_s), ..., 666 (w; ν_s(SiOSi)), ..., 439 (m), 401 cm^{-1} (m); UV-vis (n-hexane): λ_{max} (ε) = 320 (5000), 270 nm (12000); EIMS m/z (%): 108 (20) [M^+], 107 (60) [M^+ − H], 91 (100) [$C_7H_7^+$]; HRMS (ESI) m/z: [M + H]$^+$ calcd for $C_{21}H_{38}N_4O_6S$, 475.2591; found, 475.2593. Anal. calcd for $C_{45}H_{28}N_4O_7$: C 62.47, H 3.41, N 6.78; found: C 62.27, H 3.46, N 6.80.
Numbered lists may also be included and should look like this:

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This is an example of single line numbered equation.

$$\frac{d[F_1]}{d\omega_2} = SAm_2 \cos\omega, \frac{d[F_1]}{d\omega_3} = SAm_2 \cos\omega. \tag{1}$$

This is an example of a multiline numbered equation.

$$p_{t_{10,1}} = \left(\frac{N_{cu}^2}{N_c^2}\right)\left(\frac{N_{ar}^2}{N_a^2}\right)\left(\frac{N_{ar}-1}{N_{ar}}\right), \tag{2}$$

$$p_{t_{10,2}} = \left(\frac{N_{cu}^2}{N_c^2}\right)\left(\frac{N_{ar}}{N_a^2}\right). \tag{3}$$

For more on equations, please refer to the guide.

OTHER SPECIFICATIONS (FIRST LEVEL HEADING)

Figures, tables, and equations must be inserted in the text and may not be grouped at the end of the paper. Important: A miscount of figures, tables, or equations may result from revisions. Please double check the numbering of these elements before you submit your paper to your proceedings editor.

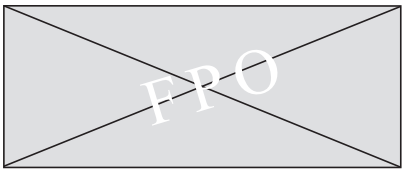

FIGURE 1. To format a figure caption use the LaTeXtemplate style: Figure Caption. The text "FIGURE 1," which labels the caption, should be bold and in upper case. If figures have more than one part, each part should be labeled (a), (b), etc. Using a table, as in the above example, helps you control the layout.

Figures (Second Level Heading)

If you need to arrange a number of figures, a good tip is to place them in a table, which gives you additional control of the layout. Leave a line space between your figure and any text above it, like this one:

Cite all figures in the text consecutively. The word "Figure" should be spelled out if it is the first word of the sentence and abbreviated as "Fig." elsewhere in the text. Place the figures as close as possible to their first mention in the text at the top or bottom of the page with the figure caption positioned below the figure, all centered. Figures must be inserted in the text and may not follow the Reference section. Set figure captions in 9 point size, Times Roman font. Type the word "FIGURE 1." in bold uppercase, followed by a period.[1]

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Tables (Second Level Heading)

Due to the wide range and complexity of tables, we simply offer an example for guidance. Please follow the style for Table 1 (and figure) captions.

TABLE 1. To format a table caption, use the LaTeXtemplate style: Table Caption. The text "**TABLE 1,**" which labels the caption, should be bold and all letters capitalized. Center this text above the table. Tables should have top and bottom rules, and a rule separating the column heads from the rest of the table only.

	Single outlet	**Small multiple***	**Large multiple**	**Total**
1982	98	129	620	847
1987	138	176	1000	1314
1991	173	248	1230	1651
1998	200	300	1500†	2000

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† This is an example of second tablenote entry.

[1] This is an example of a footnote.

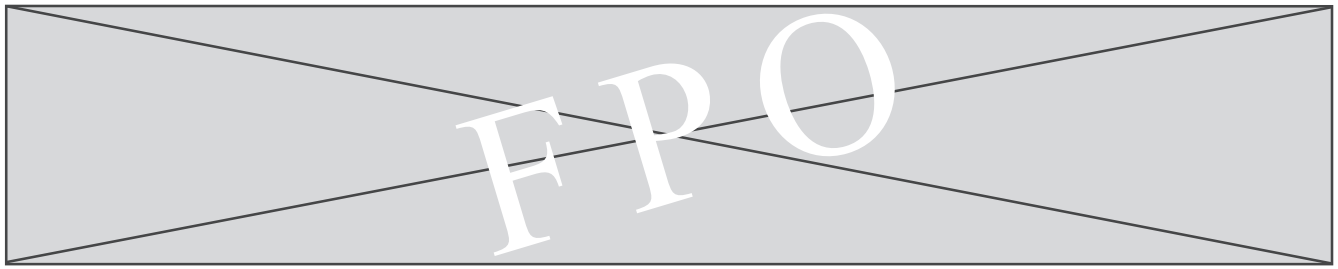

FIGURE 2. To format a figure caption use the LaTeXtemplate style: Figure Caption. The text "FIGURE 2," which labels the caption, should be bold and in upper case. If figures have more than one part, each part should be labeled (a), (b), etc. Using a table, as in the above example, helps you control the layout.

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ACKNOWLEDGMENTS

The reference section will follow the "Acknowledgment" section. References should be numbered using Arabic numerals followed by a period (.) as shown below, and should follow the format in the below examples.