

# A DEMONSTRATION DOCUMENT FOR THE REVMEXAA CONFERENCE SERIES

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## ABSTRACT

This document (`rm-extenso.tex`—last updated 2007 Sep 10) gives a brief tutorial in the use of version 3 of the `rmaa` L<sup>A</sup>T<sub>E</sub>X macros and can also serve as a template for the preparation of papers to be published in conference proceedings. More details can be found in the user guide (`rm-sc-authorguide.pdf`). Templates for one-page poster contributions (`rm-onepage.tex`) and short abstracts (`rm-shortabstract.tex`) are distributed separately. It is assumed you are already familiar with the rudiments of L<sup>A</sup>T<sub>E</sub>X. In case you are not, some suitable references are given in `rm-sc-authorguide.pdf`.

## RESUMEN

**Favor de proporcionar un resumen en español. If you are unable to translate your abstract into Spanish, the editors will do it for you.** This document (`rm-extenso.tex`—last updated 2007 Sep 10) gives a brief tutorial in the use of version 3 of the `rmaa` L<sup>A</sup>T<sub>E</sub>X macros and can also serve as a template for the preparation of papers to be published in conference proceedings. More details can be found in the user guide (`rm-sc-authorguide.pdf`). Templates for one-page poster contributions (`rm-onepage.tex`) and short abstracts (`rm-shortabstract.tex`) are distributed separately. It is assumed you are already familiar with the rudiments of L<sup>A</sup>T<sub>E</sub>X. In case you are not, some suitable references are given in `rm-sc-authorguide.pdf`.

*Key Words:* H II regions — ISM: Jets and outflows — Stars: Pre-main sequence — Stars: Mass loss

## 1. GENERAL

Please use standard L<sup>A</sup>T<sub>E</sub>X sectioning commands to subdivide your document. You should use mixed case for the section titles, although in the current style this only really matters at the level of `\subsection` and below.

It is preferable to use the `\label/\ref` mechanism<sup>5</sup> for cross-references in order to (1) minimise the chance of errors, and (2) allow automatic hyperlinks in PDF output (not yet implemented, but will be soon).

The style that should be used for cross-references is, for example, Figure 4, Table 1, equation (1), and § 3, where the section symbol “§” is produced by the L<sup>A</sup>T<sub>E</sub>X command “`\S`”.

In § 2, I discuss a few pedantic points that I keep running up against when editing papers. In § 3, I discuss some simple and not-so-simple ways of including

postscript graphics. In § 4, I discuss preparation of tables, focusing on differences from standard L<sup>A</sup>T<sub>E</sub>X. In § 5, I discuss the style of citations and reference lists.

## 2. COMMON ERRORS AND HOW TO AVOID THEM

Usually, the *right* way of doing things is no more difficult than the *wrong* way.<sup>6</sup> At least, this is true once you have had a bit of practice . . .

### 2.1. Special Commands Inherited from AAS Macros

The `rmaa` macros implement all the “astronomical” commands defined in the AAST<sub>E</sub>X macros. Please try to use these since it helps ensure consistency of appearance and usage between papers. In many cases I have tried to improve on the AAST<sub>E</sub>X implementations. Commonly used examples are

- The `\ion` command: H II, Fe XXVI, etc. This can be happily used inside or outside math mode and inside figure captions. The ion stage can be specified as an arabic or roman numeral: `\ion{H}{2}`, `\ion{H}{iii}`, and `\ion{H}{II}` will all produce the same output. One caveat: `\ion` cannot be used inside the `\addkeyword` command—just use H~II there if necessary.

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<sup>4</sup>Full postal addresses are now given here instead of at the end of the paper (new as of v3.19, 19 Jan 2006).

<sup>5</sup>Note that this sometimes requires L<sup>A</sup>T<sub>E</sub>X to be run twice in order to resolve all of the references.

<sup>6</sup>Please let me know if you think any of my advice in this section is wrong. I have made mistakes before . . .

• The `\arcsec`, `\arcmin` and `\arcdeg` commands, together with their “fractional” relatives, `\farcs`, etc. These are used in the following way:

...at declination  $15^{\circ} 33' 22'' 2$  ...

Again, they can be used inside or outside math mode.

## 2.2. Math Symbols and Equations

Symbols for physical quantities should usually be italic: velocity,  $v$ , density,  $N$ , etc. However, multi-letter symbols generally look better in roman: FWHM, EM, etc. Subscripts should be in roman (coded using `\mathrm`) unless they are themselves variables:  $N_e$ ,  $T_{\text{eff}}$ , but  $\sum_i a_i$ . Physical units should in roman, with thin spaces: 10 K,  $1.2 \times 10^{-12} \text{ erg cm}^{-2} \text{ s}^{-1}$ , etc. Things generally come out best if you place an entire expression within a single pair of  $\$$ 's and then make judicious use of `\mathrm`. For example

$$\text{FWHM} = \int N_e N_i dz$$

Remember that the “minus sign” only exists inside math mode: minus two is  $-2$ , not  $-2$ , nor even  $-2$ ! Also, remember that spacing inside math mode is designed for equations, not words, so you shouldn't use  $\$$ 's just to get italic text. Compare *effective* and *effective*.

The `\frac` command (and its T<sub>E</sub>X relative `\over`) are best only used in displayed equations. Something like

$$x = \frac{a+b}{c} \quad (1)$$

looks fine, whereas  $x = \frac{a+b}{c}$  is somewhat cramped. Better rewritten as  $x = (a+b)/c$ .

**How to define a macro that can be used inside or outside math mode.** Use the `\ensuremath` command. For instance:

```
\newcommand{\fluxunits}{%
  \ensuremath{\mathrm{erg\,s^{-1}\,cm^{-2}}}}
```

Then you can write either `15.1\,\fluxunits` or `$2.3\times 10^{-11}\,\fluxunits$`

## 2.3. Spacing After Periods

T<sub>E</sub>X/L<sup>A</sup>T<sub>E</sub>X distinguishes between inter-word spaces and inter-sentence spaces. The latter are slightly wider and considerably more “stretchy” than the former. A period that follows a lower-case letter is assumed to end a sentence, while one that follows an upper-case letter is not. This heuristic produces correct results 99% of the time, but there are two cases

where you need to give a helping hand by using the `\@` command, which causes L<sup>A</sup>T<sub>E</sub>X to “forget” what was just before it.

### Lower case abbreviations ending in periods.

The only common example is “et al.”, which should always be coded as, for example,

Henney et~al.\@ (2002).

Other examples, such as “e.g.” and “i.e.” should normally be followed by a comma, so do not present this problem. The only other example I have encountered is “cf.” but this should be followed by a tie since we don't want a linebreak between it and the following word:

(cf.~Jones 1990)

**Sentences that end in a capital letter.** These are more common than you might think and should be coded as in the following examples.

```
provided by NASA\@. Next sentence
...provided by NASA. Next sentence ...

a width of 1.5\,\AA\@. Next sentence
...a width of 1.5 Å. Next sentence ...
```

Note that “Å” is considered by L<sup>A</sup>T<sub>E</sub>X to be a capital letter, as in the second example.

## 2.4. Spacing in/after macros

It is never a good idea to include explicit space at the end of a definition of a user macro. Examples such as the following should be avoided:

```
\newcommand{\kms}{km\,s^{-1}}$ } Wrong!
```

This will make the spacing come out right when you write

```
a speed of 5000~\kms is quite fast
a speed of 5000 km s^{-1} is quite fast
```

but it won't work if the macro is followed by a punctuation mark, such as

```
with values 5~\kms, 10~\kms, and
with values 5 km s^{-1}, 10 km s^{-1}, and ...
```

The right way<sup>7</sup> to go about this is to define the macro without any following space:

```
\newcommand{\kms}{km\,s^{-1}}$ } Right!
```

Then, whenever you use the macro *always* follow it with an empty pair of braces, i.e., `\kms{}`. That way the spacing will come out right in all circumstances.

<sup>7</sup>Of course, an even better way would be to use `\ensuremath`, as described above in § 2.2

### 2.5. Excessive Fiddling With the Layout

The `rmaa` macros include various commands for final tweaking of a paper, such as `\adjustfinalcols`, `\RescaleTitleLengths`, etc. In general you should leave all this to the editors. Yes, you may have eliminated all the widows and orphans and beautifully balanced the columns on the last page, but changing one word in the Spanish abstract could well throw all that out of alignment...

### 2.6. Other Little Things

By tradition, satellites should be in italic: *HST*, *ISO*, etc. Don't ask me why.

Compound adjectives are generally hyphenated, whereas the corresponding noun is not. E.g., "mass-loading rate" but "in the absence of mass loading". However, you shouldn't hyphenate a number (written as digits) and a unit. E.g., "using a 4 m telescope", "we observed 15 GHz emission".

A range of numbers is indicated by an "en-dash" (–), coded as `--`, as in "in the range 4000–6000 Å". An "em dash" (—), coded as `---` is used for punctuation. For example:

We also stress that our observations—at a single wavelength—cannot confirm the thermal nature of the emission.

There should be no space around the "—".

Numbers larger than 9999 should have a comma. E.g., 10,000 K but 9000 K.

## 3. INCLUDING EPS FIGURES

Figure 1 shows the simplest possible example of how to include an EPS graphic file in a single-column figure. In order to produce the highest-quality results and the smallest-possible EPS file sizes, it is important to make sure you are using a vector format for the text and line-art parts of the graphic. Failure to do so tends to result in disasters like that shown in Figure 2. Either that, or, in an effort to produce acceptable quality lines and text from a raster-format EPS file, you end up with the file being many megabytes in size. A common cause of problems is the use programs such as `xv` or `ImageMagick`. Once a postscript file has been read in by one of these programs and then saved again (even if saved as postscript), it has been irreversibly converted into a raster format, usually with drastic concomitant loss of quality.

Sometimes your figure will come out sideways when you try to include it. In this case you should use the `angle` keyword to `\includegraphics`, as shown in Figure 3.

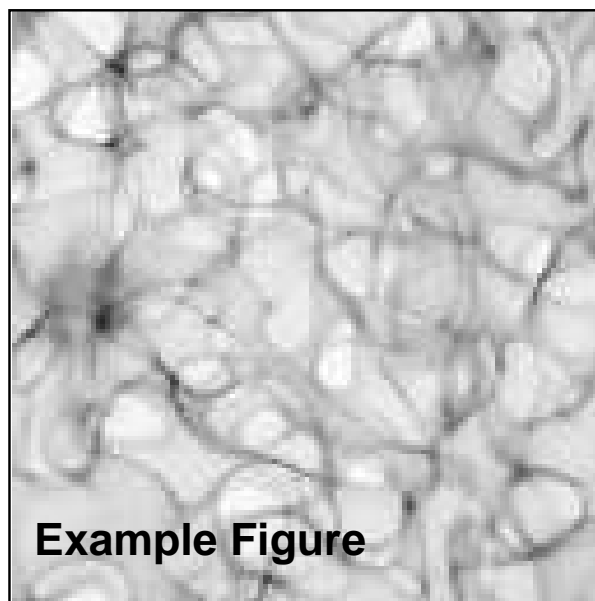


Fig. 1. Example of a simple single-column figure.



Fig. 2. How not to do a figure. This may not look so bad on the screen but try printing it out and you'll see what I mean.

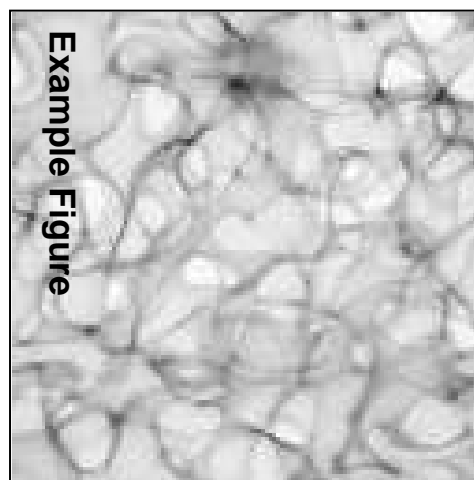


Fig. 3. Example of a rotated figure using the `angle` keyword to `\includegraphics`. Note that in the general case of a non-square figure, `angle=` should come before `width=` to avoid confusion. In this example the figure has also been reduced to 80% of the column width and is centered by means of the `\centering` command. You should not use the `center` environment for this since it introduces unwanted vertical space.



Fig. 4. Example of a cropped figure using the `bb` and `clip` keywords. The syntax is “`bb =  $x_0$   $y_0$   $x_1$   $y_1$` ” where  $(x_0, y_0)$  and  $(x_1, y_1)$  are the coordinates (in points) of the bottom-left and upper-right corner, respectively. Note that the EPS file used for this figure is the same as in the other examples.

On other occasions, you only want to include a certain portion of the EPS graphic. This can be achieved by means of the `bbox` keyword, which allows you to manually specify the graphic’s bounding box, as illustrated in Figure 4. You will also want to use the `clip` keyword to prevent the unwanted parts of the figure from being displayed. This technique is also useful in cases where the bounding box specified in the EPS file is not “tight” around the graphic. The easiest way to find the bounding box you want is to load the EPS file in `gv` or a similar program. Then, when you move the mouse cursor over the figure, the coordinates (in points) of the current cursor position should be shown in a little window at the top-left. Thus, it is straightforward to find the coordinates of the bottom-left and top-right corners of the desired rectangular region.

Figure 5 shows a double-column figure containing two EPS graphics and Figure 6 is a more complicated example of the same.

**Color Graphics** Color plates greatly increases the printing costs and so are best avoided. On the other hand, including color figures in the online version costs nothing. The best solution is for the author to provide alternative grayscale versions of any color images, which can then be used in the printed version. Otherwise, the way your beautiful color picture gets converted to black-and-white will be entirely at the mercy of the editors and printers. Remember, too, that grayscale images generally look better on a negative scale.

#### 4. HOW TO DO TABLES

An example of a simple table is given in Table 1. Some points to note are:

1. We use the `booktabs` package (loaded automatically), which gives improved vertical layout with respect to the standard `LATEX` version. As a user, the only impact of this is that you must use `\toprule`, `\midrule`, and `\bottomrule` instead of `\hline` to give the horizontal rules. Vertical rules should never be used.

TABLE 1  
A SIMPLE TABLE ( $x = 1.0$ )<sup>a</sup>

Ion	NGC 5461	NGC 5471
O <sup>0</sup>	$7.08 \pm 0.20$	$6.63 \pm 0.20$
O <sup>+</sup>	$8.08 \pm 0.14$	$7.32 \pm 0.14$
O <sup>++</sup>	$8.32 \pm 0.07$	$8.02 \pm 0.07$
N <sup>+</sup>	$7.04 \pm 0.12$	$6.01 \pm 0.13$
Ne <sup>++</sup>	$7.59 \pm 0.11$	$7.32 \pm 0.10$
S <sup>+</sup>	$6.02 \pm 0.19$	$5.47 \pm 0.20$
S <sup>++</sup>	$7.00 \pm 0.10$	$6.45 \pm 0.10$
Cl <sup>++</sup>	$4.93 \pm 0.16$	$4.20 \pm 0.16$
Ar <sup>++</sup>	$6.15 \pm 0.12$	$5.55 \pm 0.14$
Ar <sup>3+</sup>	...	$5.07 \pm 0.10$

<sup>a</sup>Note the use of `\lowercase` to prevent the  $x$  from being converted to upper case.

2. Footnotes to the table can be entered using a `\tabnotemark`, `\tabnotetext` pair. Note that `\tabnotetext` occurs inside the `tabular` environment and that for it to work properly you must use the `\tablecols` command to specify the number of columns in the table and set the length `\tabnotewidth` to a sensible value.

3. The intercolumn spacing can be adjusted by setting the length `\tabcolsep`. Things usually look best when this is set so that the table fills the entire width of a text column as closely as possible.

4. Missing data is indicated by the `\nodata` command, as in `AASTEX`.

Table 2 is a somewhat more complicated example, this time spanning both columns. Some features of this example are:

1. The use of `\cmidrule` for partial horizontal rules.

2. Somewhat elaborate adjustments to the horizontal spacing so as to visually tie together subgroups of the columns. Two different mechanisms are used to achieve this. That of putting in an empty “ghost” column is probably the easiest to manage. The other is to use the `@` specifier with a user-defined horizontal space.

If your table will not fit on one page, you can use the `longtable` package. I can provide an example of this on request.

#### 5. HOW TO DO REFERENCES

The style of the reference list follows that of the `ApJ`, `AJ`, etc. That is:

- Comma after each surname, space between initials (unlike `A&A`).

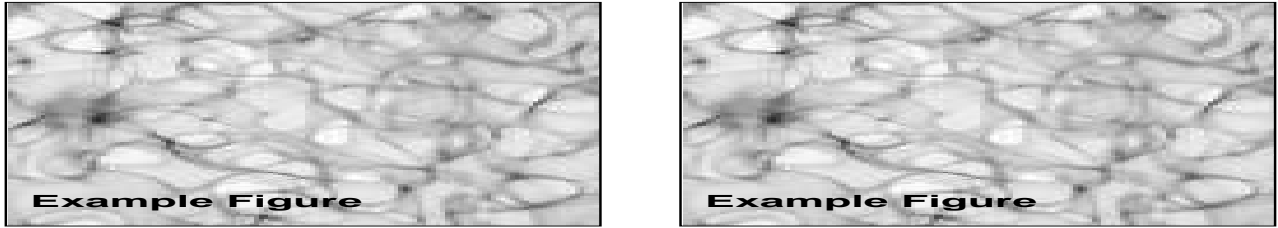


Fig. 5. Simple example of a wide figure that spans both columns and includes two EPS files. The individual EPS graphic widths and spacing between them are set to be the same as that of the columns of text (`\columnwidth` and `\columnsep`) respectively. Note the use of `%` to suppress unwanted spaces. Alternatively, you may want a single EPS graphic to span the entire width, in which case you would put `width=\textwidth` instead. In this example, both the `width` and `height` keywords are used, forcing the scaling to be anisotropic. You will never normally want to do this.

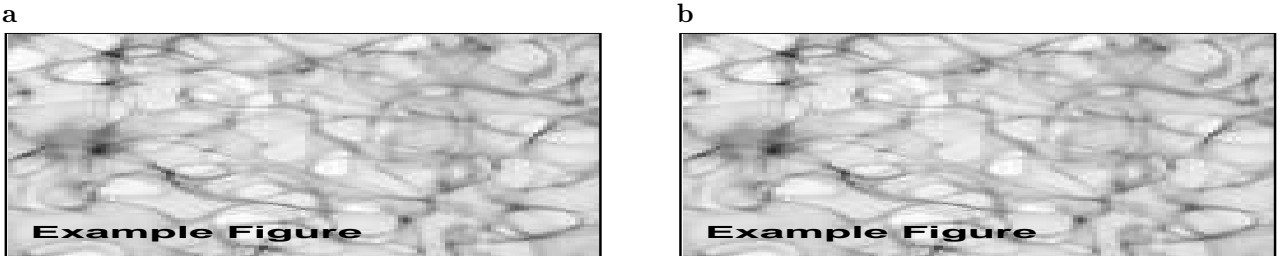


Fig. 6. A more complicated example of a multipart figure, using L<sup>A</sup>T<sub>E</sub>X itself to put the **a** and **b** labels on. (a) Multipart figures are captioned like this. (b) The second part of the figure. Note that in order to align the graphics by their top edges, it is necessary to wrap the `\includegraphics` commands, preceded by a `\vspace{0pt}`, in a `\parbox`.

TABLE 2  
A MORE INVOLVED TABLE THAT SPANS TWO COLUMNS<sup>a</sup>

Element	Ionization Stage							
	Log (Radial Average)				Log (Volume Average)			
	I	II	III	IV	I	II	III	IV
Hydrogen	−2.738	−0.001	...	...	−1.610	−0.011	...	...
Helium	−1.661	−0.009	...	...	−0.567	−0.137	...	...
Nitrogen	−3.045	−0.836	−0.069	−3.605	−1.785	−0.270	−0.351	−4.288
Oxygen	−2.822	−0.452	−0.191	...	−1.584	−0.150	−0.574	...
Neon	−2.842	−0.169	−0.494	...	−1.815	−0.058	−0.960	...
Sulfur	−5.322	−1.276	−0.042	−1.420	−4.247	−0.597	−0.132	−2.069
Chlorine	−4.716	−1.093	−0.041	−2.037	−3.644	−0.477	−0.177	−2.689
Argon	−3.585	−1.382	−0.023	−1.996	−2.283	−0.490	−0.175	−2.657

<sup>a</sup>The original of this and the previous table come from Luridiana et al. (2002) RevMexAA 38, 97.

- No comma before year.
- Commas everywhere else.
- If there are more then 6 authors you should use et al.

An almost bulletproof way of getting your reference list right is to grab them from ADS (select “AAS-TEX reference style”). The `rmaa` macros recognize all the AAS journal abbreviation commands.

In the text, references should be cited as follows:

... it has been found (García 1990; López 2000a,b) that ... following Bloggs (1990) ... is not true (despite what Rodríguez 1759 maintains) ...

Note the use of semicolons between consecutive references and the lack of comma between author and date. In order to save effort and reduce errors, it is preferable to use commands from the `natbib` package to automate the references in the text, as in the

following example:

... it has been found (Arthur & Hoare 2006; Baldwin et al. 1991; Dale et al. 2005) that ... following García-Segura & Franco (1996) ... is not true (despite what Strömberg 1939 maintains) ...

See `authorguide.pdf` for more examples and explanation. For the reference keys, one can use the ADS bibliographic code, which is the default for references obtained from ADS. Alternatively, if these prove too hard to remember<sup>8</sup>, any mnemonic string may be used.

It is also possible to automate the generation of the reference list itself using BibTeX, but support for this in the macros is still experimental. For further details, see `authorguide.pdf`.

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<sup>8</sup>There is no need to remember the keys if you use an editor that understands L<sup>A</sup>T<sub>E</sub>X references, such as RefTeX mode in emacs.