# Supplying graphics to *Journal of Physics: Conference Series*

## 1. Introduction

In these notes we describe the graphics formats supported for submissions to *Journal of Physics: Conference Series*. Currently, the following formats are supported:

- For **Microsoft Word** submissions: EPS, WMF, TIFF, GIF, JPEG, BMP.
- For **LaTeX** submissions: EPS only.

## 2. Application files

Please do **not** supply your graphics as PowerPoint, Excel, Origin or any other application file because we will not be able to use them. **You should export all your graphics into one of the acceptable graphics formats**.

   If you are using Microsoft Word to prepare your paper please make sure you embed the graphics in the Word document and supply them as individual graphics files. If your graphics cannot be exported to a suitable file format, copy/paste them directly into your Word document.

## 3. Naming your files

Please consider the following when you prepare your figure files:

- **do not use spaces** in figure file names;
- **do not use long descriptive names** for figure files, for example 'deltacurvevariation.eps'; give them a name which easily identifies the figures they contain—for example 'Figure1.eps', 'Figure2a.tif', 'Figure2b.tif' and so forth.

## 4. A note on file sizes

Institute of Physics Publishing often receives individual graphics files (usually TIFF, or EPS containing a bitmap) in excess of 50 MB in size. Such huge files, even when compressed, can present electronic transmission problems for authors. Generally, such large files can be avoided by appropriate choice of image resolution and number of colours present in the bitmap (see section 5).

   When you supply your final paper to the conference organiser remember to **send your all files (text, graphics and PostScript/PDF) as a single compressed file,** preferably using ZIP or similar compression.

## 5. Bitmap formats (TIFF, GIF, JPEG, BMP)

Please do not supply low-resolution images taken from a web site. Such low-resolution images will reproduce poorly.

### 5.1. Black and white line art

- Use a resolution of 600 dpi when you scan or export the image.

- To minimize the file size make sure that you scan or export the file using two colours only—from within your software this may be referred to as 'line art' or 'bitmap'.

*5.2. Greyscale images*

- Use a resolution of 300 dpi when you scan or export the image. Higher resolutions will increase the file size often with little or no gain in final output quality.

*5.3. Colour figures*
- Colour figures will be produced in colour in the online (PDF) version of your paper but unless there is a special colour printing arrangement with the conference organiser, any print version of the conference proceedings will be printed in black and white. Consequently, colour images will be converted to black and white and certain colours such as yellow, light greens, light blues generally reproduce poorly.
- Use a resolution of 300 dpi when you scan or export the image. Higher resolutions will increase the file size often with little or no gain in final output quality.
- The more colours used in a bitmap file the greater the file size so try to minimise the number of colours—a maximum of 256 colours may be sufficient.

*5.4. TIFF (Tagged-Image File Format)*

- To minimize file sizes, when you save or export the image use one of the common TIFF compression options (such as LZW). If you are using Microsoft Word make sure it is able to import your TIFF files.

*5.5. GIF (Graphics Interchange Format)*

- GIF files are limited to 256 colours.
- Uses LZW ('lossless') compression to reduce file size.

*5.6. JPEG (Joint Photographic Experts Group)*

- The JPEG compression method *discards image data* and is referred to as 'lossy' compression.
- Although a 'higher quality' compression setting in your software results in less data being discarded, JPEG compression may degrade details in an image—particularly in images that contain type or vector art.
- Do not repeatedly resave a JPEG file because the loss of image data occurs each time you resave the image. Always save JPEG files from the original (non-JPEG) image, not from a previously saved JPEG.

*5.7. BMP (Windows Bitmap)*
- A fairly simple file format with few compression options. Best avoided if possible, use TIFF instead.

**6. Windows Metafiles (WMF)**

- Although a supported format, the use of WMF files is **discouraged** because the results can be unpredictable, especially the handling of line widths, colours and fonts.

**7. Preparing Encapsulated PostScript files (EPS)**
One technique for preparing EPS files from applications that do not directly support EPS file export (under Windows and Macintosh operating systems) is to generate an EPS file using the system

PostScript printer driver—a type of 'print to file'. However, although this method of preparing EPS file might work, it is generally not recommended because the resulting EPS file may not be useable (the '%%BoundingBox:' value may be wrong—referring to the page size rather than just the size of the graphic).
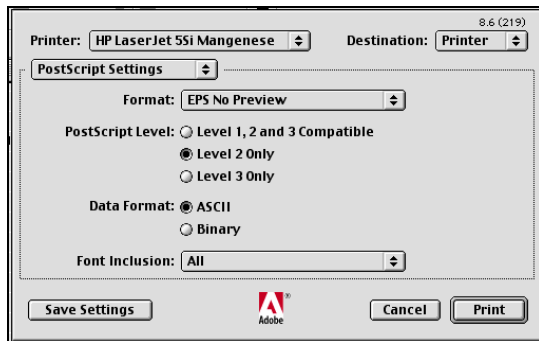


**Figure 1.** Using the PostScript printer driver on a Macintosh to produce an EPS file. **This method is *not* recommended**.
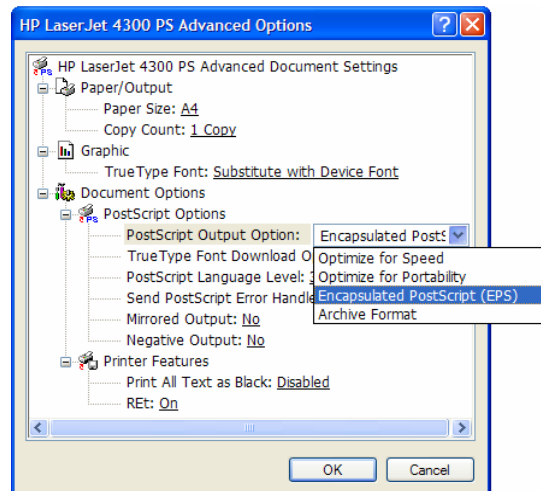


**Figure 2.** Using the PostScript printer driver on Windows to produce an EPS file. **This method is *not* recommended.**

### 7.1. Printing to file and renaming

One very important point to note is that under certain operating systems simply printing a figure to a PostScript file and renaming that file to have an .eps extension will *not* produce a useable EPS file. The reason is that the resulting file contains PostScript commands that are not permitted in EPS files, so please do not use this technique under Windows/Macintosh systems.

### 7.2. Fonts in EPS files

Many Encapsulated PostScript (EPS) files contain text formatted using specific fonts and unless your EPS files use one of the standard PostScript fonts (such as Times, Symbol, Helvetica or Courier) your graphics may not be portable to other computers and thus may not reproduce correctly (characters or symbols may be missing or incorrectly formatted on output).

To avoid font problems please create all your graphics using one of the standard fonts (Times, Symbol, Helvetica or Courier). Naturally, this does depend on whether the software with which the graphics are prepared allows you to determine the fonts it uses. If you cannot change or select the fonts within the application used to produce your illustrations, please consider exporting the graphic in a bitmap format such as a 300 dpi TIFF (if the software provides this option)—if you are using LaTeX make sure to convert any bitmaps to EPS files (using utilities such as ImageMagick (see section 8)).

### 7.3. Font embedding in EPS files

If you have to use fonts other than Times, Symbol, Helvetica or Courier please try to embed the fonts within any EPS files that you supply with your paper. Again, the ability to embed fonts in EPS files depends on the features provided by the application used to create the graphics.

Here are some example screen images from applications that let you control font output in EPS files.
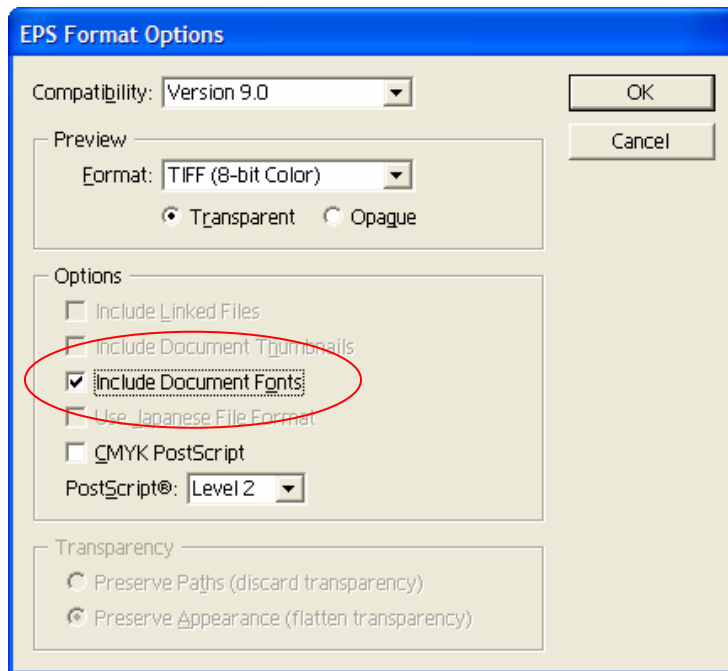
**Figure 3.** Adobe Illustrator 9's *EPS Export Options* dialog box lets you embed fonts in the EPS file.



**Figure 4.** CorelDRAW 10's *EPS Export* dialog box allows you to convert text to curves or embed the font data.
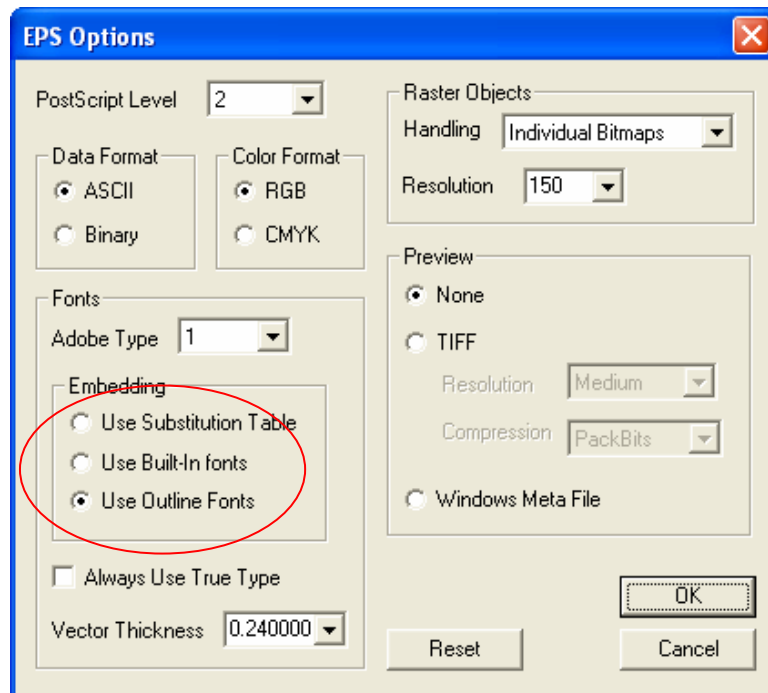
**Figure 5.** Origin 6's *EPS Options* dialog box lets you control font embedding.

### 8. *Smaller EPS files ('Level 2' PostScript)*
If you need to convert bitmaps to EPS you may want to consider creating EPS files that use so-called 'Level 2' PostScript because this has in-built data compression features which can *greatly* reduce the size of the resulting EPS file. Note that this can, depending on the software used, create EPS files containing binary data.

### 9. Resources
The following links may provide further help in preparing the graphics files of your article.

*9.1. ImageMagick*
A comprehensive set of free tools for manipulating almost all known graphics formats.
http://www.imagemagick.org/

*9.2. GhostScript*
Free tool for viewing, manipulating and converting PostScript, EPS and PDF files. GhostScript can also create PDF files from PostScript files.
http://www.cs.wisc.edu/~ghost/

*9.3. jpeg2ps*
A free utility for converting JPEG files to EPS. DOS executables and C source code available from here:
http://www.pdflib.com/products/more/jpeg2ps.html

*9.4. Using EPS files with LaTeX*
Go to www.ctan.org and search for the file 'epslatex.pdf' by Keith Reckdahl which is a superb overview of using EPS files within LaTeX.