The HEP-FLOAT package*

Float placement defaults and side-by-side figures, tables and panels

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Abstract

The HEP-FLOAT package configures float placement for publication-style documents and adds convenience wrappers for figures, tables, sub-floats, and graphics. It centres float contents by default, provides side-by-side figure and table environments, loads BOOKTABS, MULTIROW, and SUBCAPTION, and defines compact graphics helpers.

The HEP-FLOAT package can be loaded with `\usepackage{hep-float}`.

`figure` (*env.*)
`table` (*env.*)

Automatic float placement is adjusted to place a single float at the top of pages and to reduce the number of float pages, using the LaTeX macros.

`\setcounter{bottomnumber}{0}`	no floats at the bottom of a page (default 1)
`\setcounter{topnumber}{1}`	a single float at the top of a page (default 2)
`\setcounter{dbltopnumber}{1}`	same for full widths floats in two-column mode
`\renewcommand{\textfraction}{.1}`	large floats are allowed (default 0.2)
`\renewcommand{\topfraction}{.9}`	(default 0.7)
`\renewcommand{\dbltopfraction}{.9}`	(default 0.7)
`\renewcommand{\floatpagefraction}{.8}`	float pages must be full (default 0.5)

`local`

The most useful float placement is usually achieved by placing the float *in front* of the paragraph it is referenced in first. Additionally, manual float placement can be deactivated using the `local` package option.

`\raggedright`

The float environments have been adjusted to center their content. The usual behaviour can be reactivated using `\raggedright`.

`figures` (*env.*)
`\figure`
`\figurehspace`
`\figurevspace`

The `figures` environment places several figure panels next to each other inside one `figure` float. It takes an optional vertical alignment and a mandatory argument that is either the number of equal-width figures or the width of the first figure as a fraction of `\linewidth`. Inside the environment the `\figure[`⟨*vertical alignment*⟩`]` macro starts the next figure panel, which is bottom aligned by default. The first `\caption[`⟨*short*⟩`]{`⟨*long*⟩`}` of each panel numbers the panel as a figure. The horizontal and vertical spacing are controlled by `\figurehspace` and `\figurevspace`.

`tables` (*env.*)
`\table`
`\tablehspace`
`\tablevspace`

The `tables` environment is the analogous wrapper for several tables inside one `table` float. Inside the environment `\table` starts the next table panel, and `\tablehspace` and `\tablevspace` control the spacing.

`panels` (*env.*)
`\panel`

The `panels` environment makes use of the SUBCAPTION package [1]. It provides sub-floats and takes as mandatory argument either the number of sub-floats (default 2) or the width of the first sub-float as fraction of the `\linewidth`. Within the `\begin{panels}[`⟨*vertical alignment*⟩`]{`⟨*width*⟩`}` environment the `\panel[`⟨*vertical alignment*⟩`]` macro initiates a new sub-float, which by default

*This document corresponds to HEP-FLOAT v1.6.

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```
\begin{panels}{2}
  code
\panel
  \begin{tabular}...\end{tabular}
\end{panels}
```

(a) Code for this panel environment.

one		two	
a	b	c	d
	b	c	d

(b) The `booktabs` and `multirow` features.

Table 1: Example use of the `panels` environment in Panel (a) and the features from the BOOKTABS and MULTIROW packages in Panel (b).

has the vertical alignment of the environment. In the case that the width of the first sub-float has been given as an optional argument to the `panels` environment the `\panel{`⟨*width*⟩`}` macro takes the width of the next sub-float as mandatory argument. `panels` environments can be nested. The example code is presented in table 1a. The spacing between the panels can be adjusted by adjusting the `\panelvspace` in terms of a `\linewidth` fraction `\renewcommand*{\panelhspace}`fraction and the `\panelvspace` in terms of a length `\renewcommand*{\panelvspace}{`⟨*length*⟩`}`.

`\panelhspace`
`\panelvspace`

`tabular` (*env.*) The BOOKTABS [2] and MULTIROW [3] packages are loaded enabling publication quality tabulars such as in table 1b.

`\graphic`
`\graphics`

The GRAPHICX package [4] is loaded and the `\graphic[`⟨*width*⟩`]{`⟨*figure*⟩`}` macro is defined, which is a wrapper for the `\includegraphics{`⟨*figure*⟩`}` macro and takes the figure width as fraction of the `\linewidth` as optional argument (default 1). If the graphics are located in a sub-folder its path can be indicated by `\graphics{`⟨*subfolder*⟩`}`.

A Implementation

<*package>

Load the KVOPTIONS package [5] and define a `hepfloat` namespace.

```
\RequirePackage{kvoptions}
\SetupKeyvalOptions{
  family=hepfloat,
  prefix=hepfloat@
}
```

`local` Provide the `local` option for reactivating the manual placement of floats.

```
\DeclareBoolOption[true]{local}
\DeclareComplementaryOption{global}{local}

\ProcessKeyvalOptions*
```

Adjust the LaTeX float placement defaults

```
\setcounter{bottomnumber}{0} % 1
\setcounter{topnumber}{1} % 2
\setcounter{dbltopnumber}{1} % 2
\renewcommand*{\topfraction}{.9} % .7
\renewcommand*{\dbltopfraction}{.9} % .7
\renewcommand*{\textfraction}{.1} % .2
\renewcommand*{\floatpagefraction}{.8} % .5
```

`figure` (*env.*)
`table` (*env.*)

Center the content of `figure` and `table` environments. Ignore the manual placement if the `local` option is set to false. Classes without the standard floats, such as BEAMER, which defines non-floating `figure` and `table` environments and no `figure*`, keep their own definitions.

```
\ifcsname figure*\endcsname
\ifhepfloat@local%
  \renewenvironment{figure}[1][tbp]{%
    \@float{figure}[#1]\centering\small%
  }{\end@float}
  \renewenvironment{figure*}[1][tbp]{%
    \@dblfloat{figure}[#1]\centering\small%
  }{\end@dblfloat}
  \renewenvironment{table}[1][tbp]{%
    \@float{table}[#1]\centering\small%
  }{\end@float}
  \renewenvironment{table*}[1][tbp]{%
    \@dblfloat{table}[#1]\centering\small%
  }{\end@dblfloat}
\else%
  \renewenvironment{figure}[1][]{%
    \@float{figure}\centering\small%
  }{\end@float}
  \renewenvironment{figure*}[1][]{%
    \@dblfloat{figure}\centering\small%
  }{\end@dblfloat}
  \renewenvironment{table}[1][]{%
    \@float{table}\centering\small%
  }{\end@float}
  \renewenvironment{table*}[1][]{%
    \@dblfloat{table}\centering\small%
  }{\end@dblfloat}
\fi%
\fi
```

A.1 floats

`\hep@float@caption`

The first `\caption` in each panel of the `figures` and `tables` environments passes its star and its optional short caption on to `\captionof` and adds the vertical space below the caption.

```
\NewDocumentCommand{\hep@float@caption}{mmsom}{%
  \IfBooleanTF{#3}{%
    \captionof*{#1}{#5}%
  }{%
    \IfNoValueTF{#4}{\captionof{#1}{#5}}{\captionof{#1}[#4]{#5}}%
  }%
  \vspace{#2}%
}
```

`figures` (*env.*)
`\figure`

Define the `figures` environment that places figures next to each other.

```
\newcommand*{\figurehspace}{0.0333}
```

```
\newcommand*{\figurevspace}{.5\baselineskip}
\newenvironment{figures}[2][b]{%
  \begin{figure}%
  \let\oldcaption\caption
  \renewcommand*{\caption}{%
    \renewcommand*{\caption}{\oldcaption}%
    \hep@float@caption{figure}{\figurevspace}%
  }%
  \ifdim#2pt>1pt%
    \newcommand*{\hep@figure@space}{\figurehspace\linewidth/#2}%
    \renewcommand*{\figure}[1][b]{%
      \end{minipage}\hfill%
      \begin{minipage}[##1]{\linewidth/#2-\hep@figure@space}%
      \centering%
    }%
    \begin{minipage}[#1]{\linewidth/#2-\hep@figure@space}%
    \centering%
  \else%
    \newcommand*{\hep@figure@space}[1]{##1\linewidth*\real{\figurehspace}}%
    \renewcommand*{\figure}[2][b]{%
      \end{minipage}\hfill%
      \begin{minipage}[##1]{##2\linewidth-\hep@figure@space{##2}}%
      \centering%
    }%
    \begin{minipage}[#1]{#2\linewidth-\hep@figure@space{#2}}%
    \centering%
  \fi%
}{%
\end{minipage}\end{figure}%
}
```

`tables` (*env.*) Define the `tables` environment that places tables next to each other.

`\table`

```
\newcommand*{\tablehspace}{0.0333}
\newcommand*{\tablevspace}{.5\baselineskip}
\newenvironment{tables}[2][b]{%
  \begin{table}%
  \let\oldcaption\caption
  \renewcommand*{\caption}{%
    \renewcommand*{\caption}{\oldcaption}%
    \hep@float@caption{table}{\tablevspace}%
  }%
  \ifdim#2pt>1pt%
    \newcommand*{\hep@table@space}{\tablehspace\linewidth/#2}%
    \renewcommand*{\table}[1][b]{%
      \end{minipage}\hfill%
      \begin{minipage}[##1]{\linewidth/#2-\hep@table@space}%
      \centering%
    }%
    \begin{minipage}[#1]{\linewidth/#2-\hep@table@space}%
    \centering%
```

```
  \else%
    \newcommand*{\hep@table@space}[1]{##1\linewidth*\real{\tablehspace}}%
    \renewcommand*{\table}[2][b]{%
      \end{minipage}\hfill%
      \begin{minipage}[##1]{##2\linewidth-\hep@table@space{##2}}%
      \centering%
    }%
    \begin{minipage}[#1]{#2\linewidth-\hep@table@space{#2}}%
    \centering%
  \fi%
}{%
\end{minipage}\end{table}%
}
```

A.2 Sub-floats

Load the SUBCAPTION package [1].

```
\PassOptionsToPackage{subrefformat=parens}{subcaption}
\RequirePackage{subcaption}
\captionsetup{font=small}
\captionsetup[sub]{font=small}
```

Provide the macros for older versions of the SUBCAPTION package using the XPARSE [6] package.

```
\RequirePackage{xparse}
\providecommand*\subcaption@minipage[2]{%
  \minipage#1{#2}\setcaptionsubtype\relax%
}
\ProvideDocumentEnvironment{subcaptionblock}{O{b}m}{%
  \caption@withoptargs\subcaption@minipage[#1]{#2}%
}{\endminipage}
```

`panels` (*env.*)
`\panel`
`\panelhspace`
`\panelvspace`

Define the `panels` environment and the `\panel` macro using the CALC [7] and ETOOLBOX [8] packages.

```
\RequirePackage{calc}
\RequirePackage{etoolbox}
\newcommand*{\panelhspace}{0.0333}
\newcommand*{\panelvspace}{.5\baselineskip}
\newenvironment{panels}[2][b]{%
  \addtolength{\belowcaptionskip}{\panelvspace}%
```

Define an internal macro for global behaviour. The macros of the environment are defined locally with `\newcommand` after setting them to `\relax`, so that the environment can be nested.

```
  \let\begin@subcaption@minipage\relax
  \let\hep@panel@space\relax
  \let\panel\relax
  \newcommand*{\begin@subcaption@minipage}[2][b]{%
%     \caption@withoptargs\subcaption@minipage[##1]{##2}%
    \subcaptionblock[##1]{##2}%
```

```
    \centering\vskip 0pt%
%     \renewcommand*{\hep@panel@vspace}{\panelvspace}%
  }%
```

Define the `\panel` macro for the case that the number of panels is given.

```
  \ifdim#2pt>1pt%
    \newcommand*{\hep@panel@space}{\panelhspace\linewidth/#2}%
    \newcommand*{\panel}[1][#1]{%
      \endminipage\hfill\begin@subcaption@minipage[##1]{%
        \linewidth/#2-\hep@panel@space%
      }%
    }%
    \begin@subcaption@minipage[#1]{\linewidth/#2-\hep@panel@space}%
```

Define the `\panel` macro for the case that the width of the panel is given.

```
  \else%
    \newcommand*{\hep@panel@space}[1]{##1\linewidth*\real{\panelhspace}}%
    \newcommand*{\panel}[2][#1]{%
      \endminipage\hfill\begin@subcaption@minipage[##1]{%
        ##2\linewidth-\hep@panel@space{##2}%
      }%
    }%
    \begin@subcaption@minipage[#1]{%
      #2\linewidth-\hep@panel@space{#2}%
    }%
  \fi%
}{%
\endsubcaptionblock%
\vspace{-\panelvspace}%
}
```

A.3 Tables

`tabular` (*env.*) Enhance tabulars with the BOOKTABS and MULTIROW packages [2, 3].

```
\RequirePackage{booktabs}
\RequirePackage{multirow}
\newcommand*\header[1]{\multicolumn{1}{c}{#1}}
```

A.4 Figures

`\graphic` Provide the `\graphic` macro for the inclusion of figures using the GRAPHICX package [4]. The name of the externalised file applies only to a picture in the included graphic, as for `\tikz` files included with TIKZSCALE, and is cleared afterwards, so that it never names a later picture.

```
\RequirePackage{graphicx}
\providecommand*{\tikzsetnextfilename}[1]{}
\newcommand*{\graphic}[2][1]{\tikzsetnextfilename{#2}{%
  \centering\includegraphics[width=#1\linewidth]{#2}\par%
}\tikzsetnextfilename{}}
```

\graphics Provide the \graphics macro for the inclusion of figures located in a subfolder.

```
\newcommand*{\graphics}[1]{\graphicspath{{./#1/}}}
```

</package>

B Test

<*test>

```
\documentclass{article}

\usepackage[showframe]{geometry}
\usepackage{hep-float}

\begin{document}

\begin{figure}
\graphic[.5]{example-image-4x3}
\caption{test}
\end{figure}

\begin{figures}{.3}
\graphic{example-image-4x3}
\caption{one}
\figure{.4}
\graphic{example-image-16x9}
\caption{two}
\figure{.3}
\graphic{example-image-4x3}
\caption{three}
\figure{.3}
\graphic{example-image-4x3}
\caption{one}
\figure{.4}
\graphic{example-image-16x9}
\caption{two}
\figure{.3}
\graphic{example-image-4x3}
\caption{three}
\end{figures}

\begin{figures}{3}
\graphic{example-image-1x1}
\caption{one}
\figure
\graphic{example-image-1x1}
\caption{two}
\figure
\graphic{example-image-1x1}
```

```
\caption{three}
\figure
\graphic{example-image-1x1}
\caption{one}
\figure
\graphic{example-image-1x1}
\caption{two}
\figure
\graphic{example-image-1x1}
\caption{three}
\end{figures}


\begin{figure}
\begin{panels}{3}
\graphic{example-image-1x1}
\caption{a}
\panel
\graphic{example-image-1x1}
\caption{b}
\panel
\graphic{example-image-1x1}
\caption{c}
\panel
\graphic{example-image-1x1}
\caption{d}
\panel
\graphic{example-image-1x1}
\caption{e}
\panel
\graphic{example-image-1x1}
\caption{f}
\end{panels}
\caption{Panels}
\end{figure}

\begin{figure}
\begin{panels}{.3}
\graphic{example-image-4x3}
\caption{a}
\panel{.4}
\graphic{example-image-16x9}
\caption{b}
\panel{.3}
\graphic{example-image-4x3}
\caption{c}
\panel{.225}
\graphic{example-image-1x1}
\caption{d}
\panel{.4}
```

```
\graphic{example-image-16x9}
\caption{e}
\panel{.225}
\graphic[.8]{example-image-1x1}
\caption{f}
\end{panels}
\caption{Panels 2}
\end{figure}

\begin{tables}{2}
\begin{tabular}{cc}\toprule
a & b \\
\bottomrule\end{tabular}
\caption{a}
\table
\begin{tabular}{cc}\toprule
a & b \\
\bottomrule\end{tabular}
\caption{b}
\end{tables}

\end{document}
```

</test>

C Readme

<*readme>

```
# The ‘hep-float‘ package

Float placement defaults and side-by-side figures, tables and panels

## Introduction

The ‘hep-float‘ package configures float placement for publication-style
documents and adds convenience wrappers for figures, tables, sub-floats,
and graphics. It centres float contents by default, provides side-by-side
‘figures‘, ‘tables‘, and ‘panels‘ environments, loads ‘booktabs‘,
‘multirow‘, and ‘subcaption‘, and defines compact graphics helpers.

It can be loaded with ‘\usepackage{hep-float}‘.

## Author

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```

```
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in ‘http://www.latex-project.org/lppl.txt‘ and version 1.3c or later is
part of all distributions of LaTeX version 2005/12/01 or later.
```

</readme>

References

[1] A. Sommerfeldt. ‘The `subcaption` package: Support for sub-captions’ (2007). CTAN: `subcaption`. GitLab: `axelsommerfeldt/caption`.

[2] D. Els and S. Fear. ‘The `booktabs` package: Publication quality tables in LaTeX’ (1995). CTAN: `booktabs`.

[3] P. van Oostrum and J. Leichter. ‘The `multirow`, `bigstrut` and `bigdelim` packages: Create tabular cells spanning multiple rows’ (1994). CTAN: `multirow`.

[4] D. Carlisle and S. Rahtz. ‘Packages in the “graphics” bundle: Enhanced support for graphics’ (1994). CTAN: `graphicx`.

[5] H. Oberdiek. ‘The `kvoptions` package: Key value format for package options’ (2004). CTAN: `kvoptions`. GitHub: `ho-tex/kvoptions`.

[6] *LaTeX3 Project*. ‘The `xparse` package: A generic document command parser’ (1999). CTAN: `xparse`.

[7] *LaTeX3 Project*. ‘The `calc` package: Simple arithmetic in LaTeX commands’ (1992). CTAN: `calc`.

[8] P. Lehman and J. Wright. ‘The `etoolbox` package: e-TeX tools for LaTeX’ (2007). CTAN: `etoolbox`.

Change History

v1.0

General: First release on CTAN: panels, subfloats, captions, placement, and float styling. 1

v1.1

General: Added manual float placement, panel spacing commands, and subcaption-block compatibility. 1

v1.2

General: Added side-by-side figure and table environments with horizontal and vertical spacing controls and small centred float contents. 1

v1.3

General: Added `\header`. 1

v1.4

General: Renamed manual placement to local and global placement modes, reimplemented the figure and table wrappers through the standard float internals, and applied starred command definitions. 1

v1.5

General: Raised the LaTeX format requirement and expanded the documentation, README, and examples. 1

v1.6

General: Kept the float environments of classes without standard floats, such as beamer, fixed the alignment argument of `\panel` and short captions in side-by-side figures and tables, and centred side-by-side figure panels. . . . 1