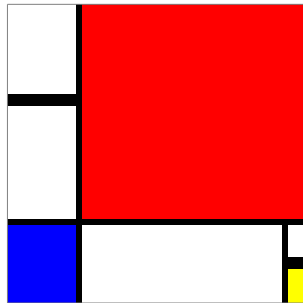


# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

## Quantum space



Jean-luc Doumont  
[www.principiae.be](http://www.principiae.be)

TUG 2010  
Wed 30 Jun 2010

# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

“I have found that all ugly things  
are made by those who strive  
to make something beautiful,

—Oscar Wilde

# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

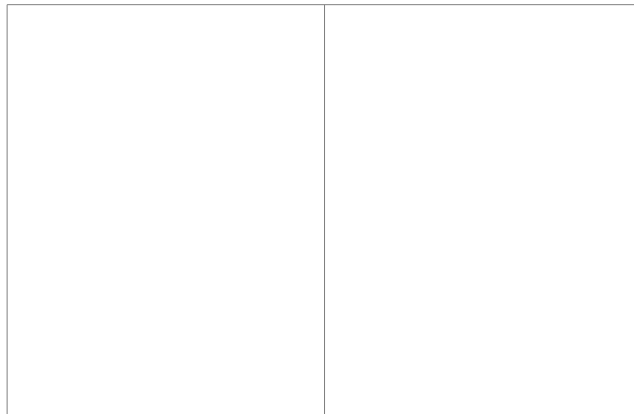
“I have found that all ugly things  
are made by those who strive  
to make something beautiful,  
and that all beautiful things  
are made by those who strive  
to make something useful.”

—Oscar Wilde

# Quantum space: designing pages on grids

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Arrange...



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

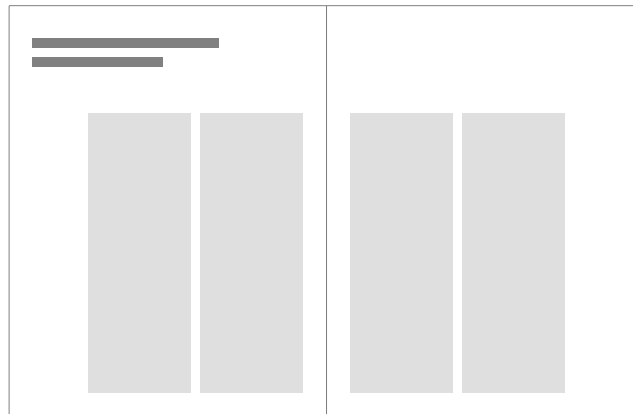
Arrange... text



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

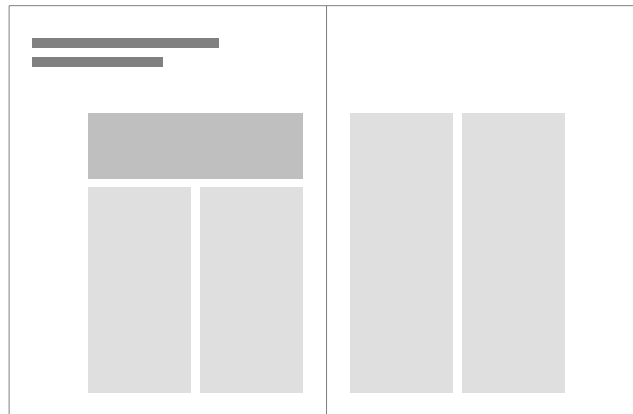
Arrange... text  
a title



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

Arrange... text  
a title  
a blurb



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

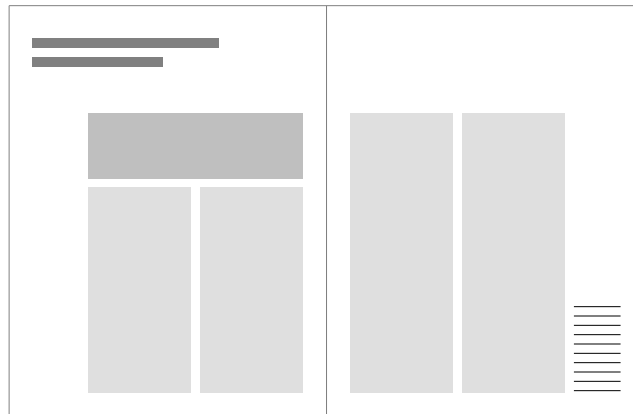
Arrange...

text

bibliographical references

a title

a blurb





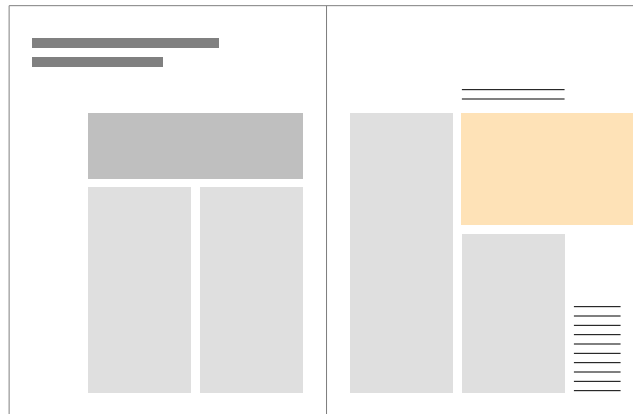
# Quantum space: designing pages on grids

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Arrange...

text  
a title  
a blurb

bibliographical references  
a photograph with its caption



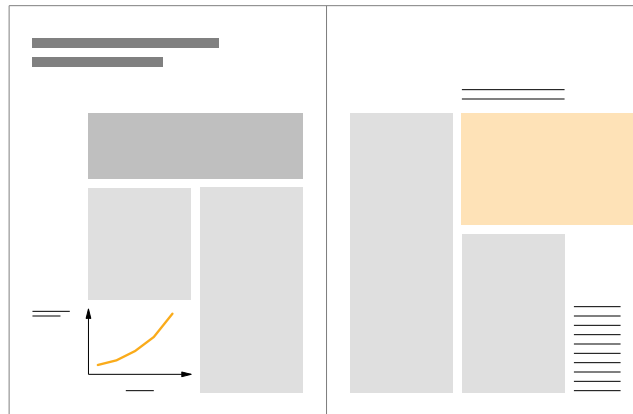
# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

Arrange...

text  
a title  
a blurb

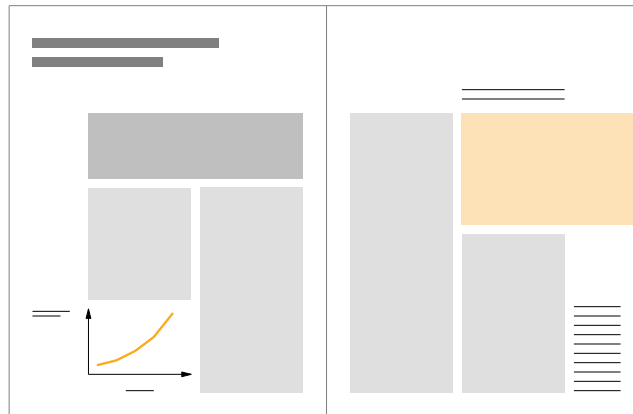
bibliographical references  
a photograph with its caption  
a line graph with labeled axes



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

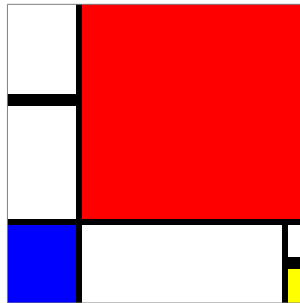
How do you do this with T<sub>E</sub>X?



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

## Quantum space

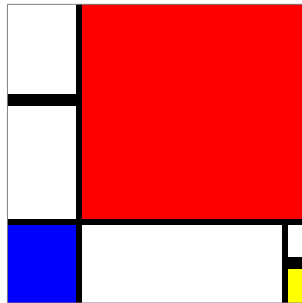


- 1 **René Descartes**  
Plane coordinates
- 2 **Albert Einstein**  
Quantum physics
- 3 **Piet Mondriaan**  
Strictest harmony

# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

## Quantum space



1 **René Descartes**  
Plane coordinates

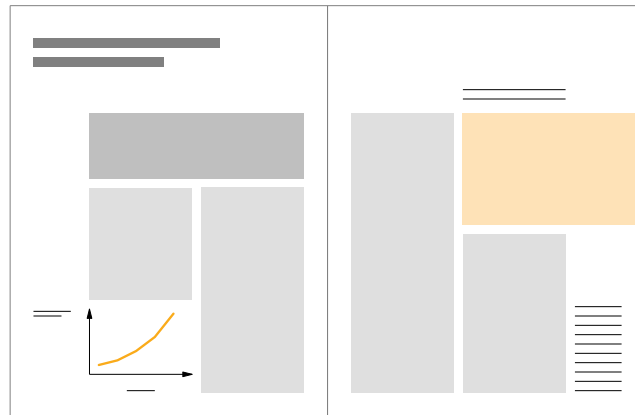
**Albert Einstein**  
Quantum physics

**Piet Mondriaan**  
Strictest harmony

# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

## A page has two dimensions



# Quantum space: designing pages on grids

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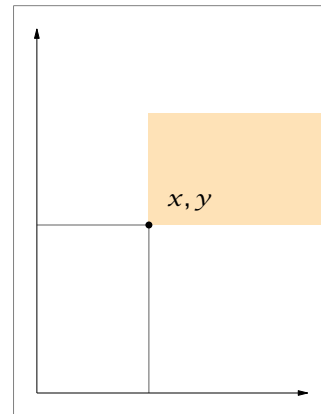
A page has two dimensions



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

Let's position the items  
in cartesian coordinates



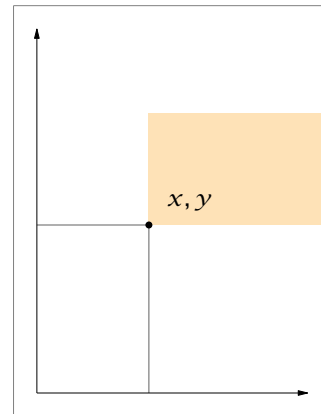


# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

Let's position the items  
in cartesian coordinates

```
\def\xy#1#2#3{\setbox0=\hbox to\z@{%  
  \kern#1\raise#2\hbox{#3}\hss}%  
  \ht0=\z@\dp0=\z@\box0}
```



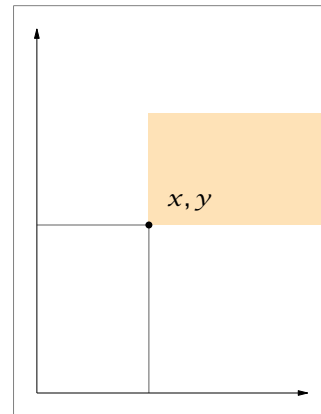
# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

Let's position the items  
in cartesian coordinates

```
\def\xy#1#2#3{\setbox0=\hbox to\z@{%  
  \kern#1\raise#2\hbox to\z@{#3}\hss}%  
  \ht0=\z@\dp0=\z@\box0}
```

```
\def\xy|#1#2#3{\xy{#1}{#2}\hss#3}  
\def\xyr#1#2#3{\xy{#1}{#2}{#3}\hss}  
\def\xyc#1#2#3{\xy{#1}{#2}\hss#3\hss}
```



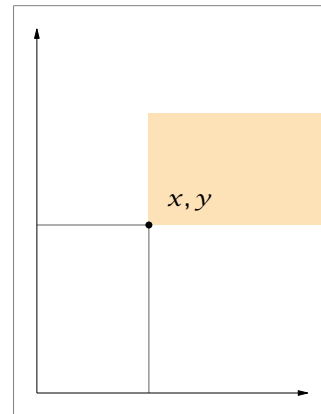
# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

Let's position the items  
in cartesian coordinates... **on the whole page**

```
\def\beginpage{\null\vfill\bgroup  
  \offinterlineskip\leftskip=\z@}  
\def\endpage{\egroup\eject}
```

```
\beginpage  
  ⋮  
\endpage
```



# Quantum space: designing pages on grids

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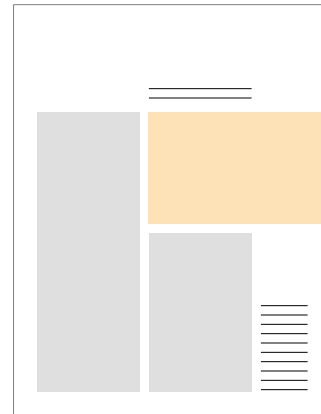


# Quantum space: designing pages on grids

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Let's place the text in scrolls  
and chunk these into pieces

```
\newbox\galley  
  
\def\text{\setbox\galley=\vbox\bgroup  
  \hsize=...}  
  
\def\endtext{\vskip-\prevdepth  
  \fil\egroup}  
  
\def\lines#1{\vsplit\galley  
  to #1\baselineskip}
```



# Quantum space: designing pages on grids

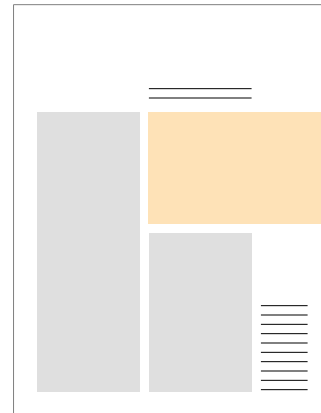
TUG | X 004 | Wed 30 Jun 2010

Let's place the text in scrolls  
and chunk these into pieces

```
\newbox\galley

\def\text{\setbox\galley=\vbox\bgroup
  \hsize=...
  \hrule}
\def\endtext{\vskip-\prevdepth
  \fil\egroup
  \setbox0=\vsplit\galley to\z@}

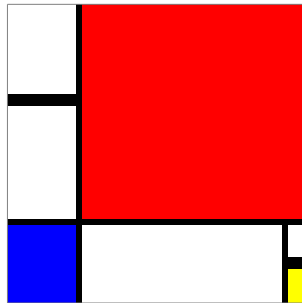
\def\lines#1{\vsplit\galley
  to #1\baselineskip}
```



# Quantum space: designing pages on grids

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## Quantum space



René Descartes

Plane coordinates

2 **Albert Einstein**  
Quantum physics

Piet Mondriaan

Strictest harmony

# Quantum space: designing pages on grids

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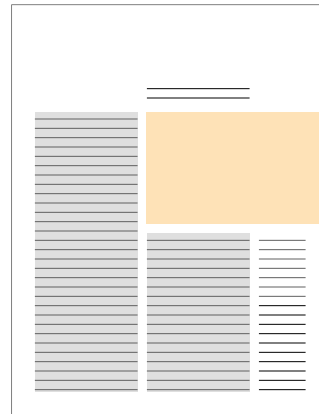




# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

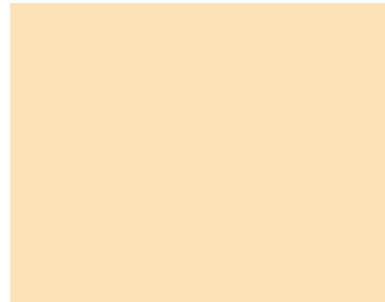
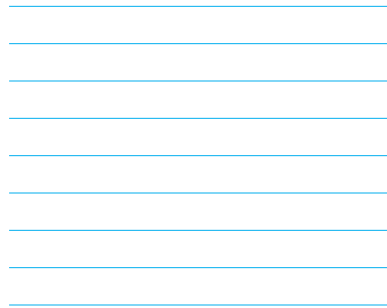
## Let's quantize space



# Quantum space: designing pages on grids

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Let's quantize space

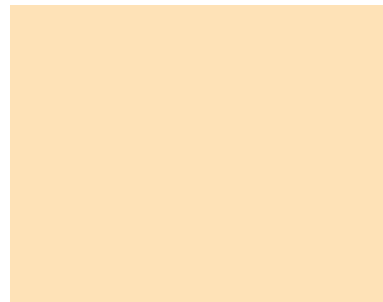


# Quantum space: designing pages on grids

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## Let's quantize space

Let's quantize space, with an offset between possible positions for text and those for more geometric items, such as frames, rules, or photographs. These geometric items should thus be dimensioned so their total height is an integer number of the quantum, which is equivalent to a baselineskip.



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

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Let's quantize space, with an offset between possible positions for text and those for more geometric items, such as frames, rules, or photographs. These geometric items should thus be dimensioned so their total height is an integer number of the quantum, which is equivalent to a baselineskip.



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

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# Quantum space: designing pages on grids

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## Let's quantize space

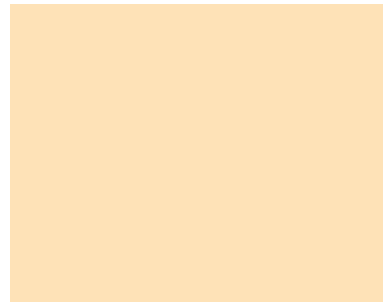
Let's quantize space, with an offset between possible positions for text and those for more geometric items, such as frames, rules, or photographs. These geometric items should thus be dimensioned so their total height is an integer number of the quantum, which is equivalent to a baselineskip.



# Quantum space: designing pages on grids

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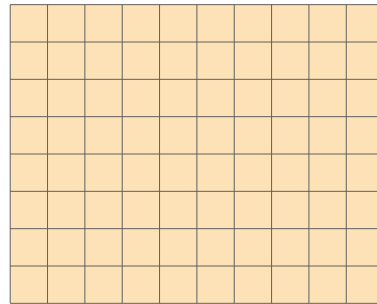
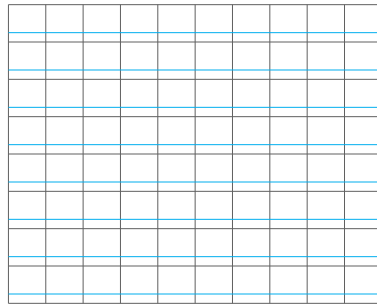
## Let's quantize space



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

Let's quantize space, both  
**vertically** and **horizontally**



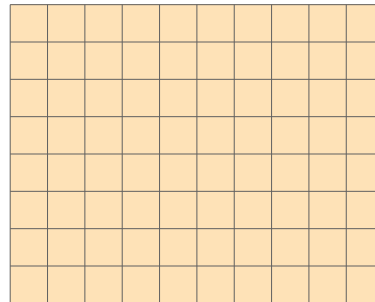
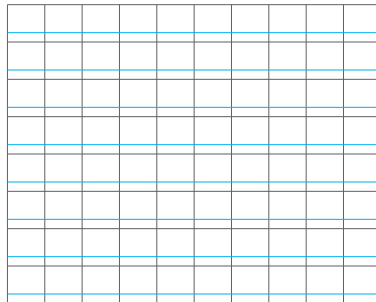


# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

Let's quantize space, both  
**vertically** and **horizontally**

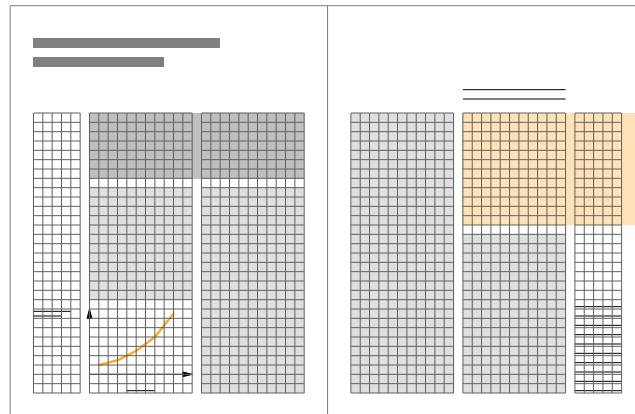
```
\newdimen\pc \pc=14bp  
\def\XY#1#2{\xy{#1\pc}{#2\pc}}
```



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

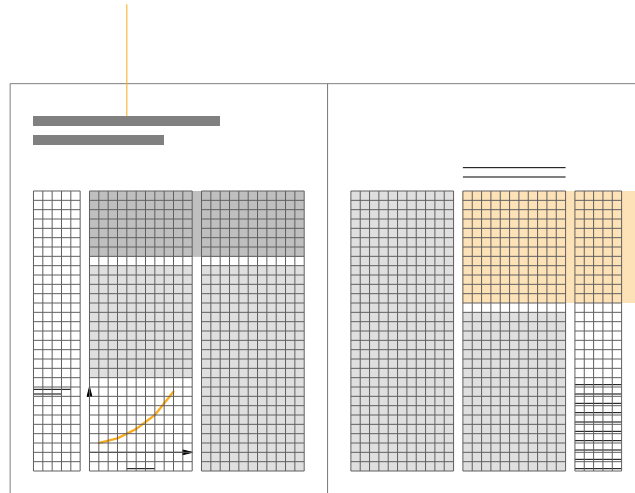
A quantum space is a flexible way  
to create harmonious designs



# Quantum space: designing pages on grids

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We can... use a subset of the grid



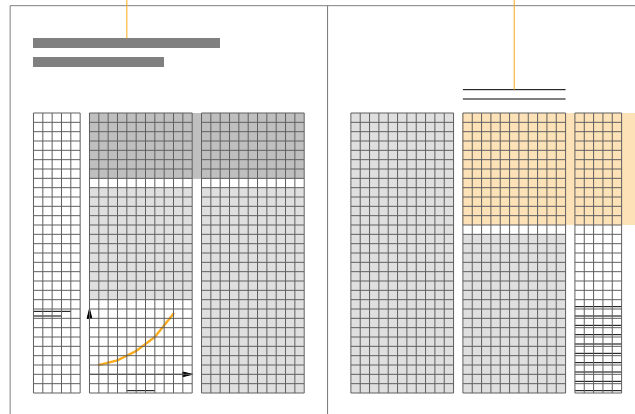
# Quantum space: designing pages on grids

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We can...

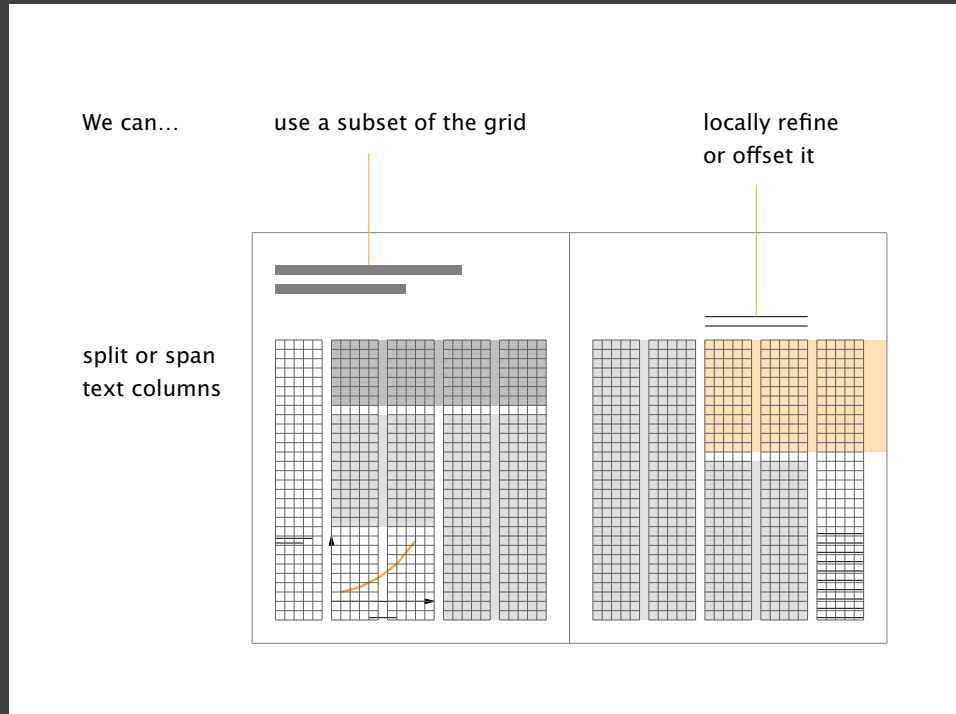
use a subset of the grid

locally refine  
or offset it



# Quantum space: designing pages on grids

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# Quantum space: designing pages on grids

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## We can quantize beyond space

Font size

Line width

Marker size

Color

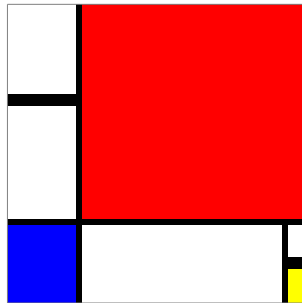
⋮

On a  $\log_2$  scale, too

# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

## Quantum space



René Descartes  
Plane coordinates

Albert Einstein  
Quantum physics

3 **Piet Mondriaan**  
Strictest harmony

# Quantum space: designing pages on grids

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We can coordinate other elements  
with the grid, including **line width**





# Quantum space: designing pages on grids

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We can coordinate other elements  
with the grid, including **line width**



# Quantum space: designing pages on grids

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We can coordinate other elements  
with the grid, including **line width**



`\newdimen\pt`

`\pt=.0625\pc`

# Quantum space: designing pages on grids

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We can coordinate other elements with the grid, including **line width**



```
\newdimen\pt                \pt=.0625\pc  
  
\newdimen\lw                \def\lwset#1{\lw=#1\pt}  
                             \def\sline{\lwset{.25}}  
                             \def\mline{\lwset{.5}}  
                             ⋮
```

# Quantum space: designing pages on grids

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We can coordinate other elements  
with the grid, including **font size**

My three laws of communication:

- adapt to your audience
- maximize the signal-to-noise ratio
- use effective redundancy

# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

We can coordinate other elements  
with the grid, including **font size**

- My three laws of communication: \_\_\_\_\_
- adapt to your audience \_\_\_\_\_
  - maximize the signal-to-noise ratio \_\_\_\_\_
  - use effective redundancy \_\_\_\_\_

# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

We can coordinate other elements  
with the grid, including **font size**

My three laws of communication: \_\_\_\_\_  
■ adapt to your audience \_\_\_\_\_  
■ maximize the signal-to-noise ratio \_\_\_\_\_  
■ use effective redundancy \_\_\_\_\_

x-height = 1\pc (14bp)

|

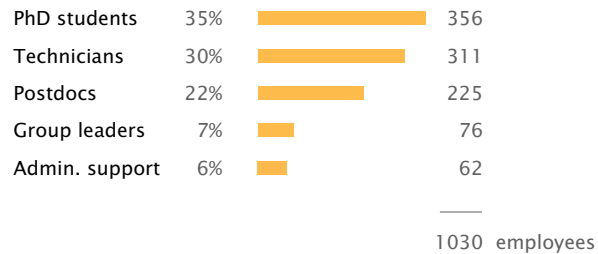
```
\def\setxfnt#1#2#3{\fntsize=26.415bp \fntsize=#3\fntsize  
\font#1=#2 at\the\fntsize}
```

```
\setxfnt\slidetitle{hlsr&r}{.5}
```

# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

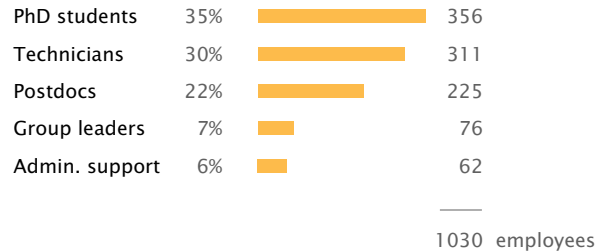
We can coordinate other elements  
with the grid, including **font size**



# Quantum space: designing pages on grids

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We can coordinate other elements  
with the grid, including **font size**



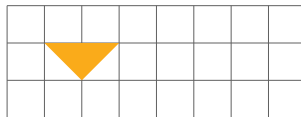
```
\def\setXfont#1#2#3{\fontsize=19.364bp ...
```



# Quantum space: designing pages on grids

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We can coordinate other elements  
with the grid, including **PDF items**

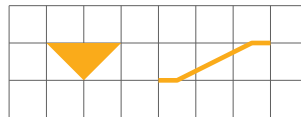


```
\pdfpc{0 0 m 1 1 1 -1 1 1 h f}
```

# Quantum space: designing pages on grids

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We can coordinate other elements  
with the grid, including **PDF items**

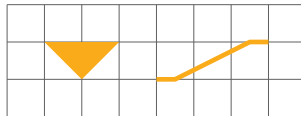


```
\pdfpc{0 0 m 1 1 1 -1 1 1 h f}  
\lwset2  
\pdfpc{0 0 m .5 0 1 2.5 1 1 3 1 1 S}
```

# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

We can coordinate other elements  
with the grid, including **PDF items**



```
\pdfpc{0 0 m 1 1 | -1 1 | h f}  
\lwset2  
\pdfpc{0 0 m .5 0 | 2.5 1 | 3 1 | S}
```

```
{\makeother{pt}\gdef\PT#1pt{#1}}
```

For  $\text{\pc}=14\text{bp}$

$$0.071162 = \frac{1}{14} \times \frac{72.00}{72.27}$$

```
\def\pdfpc#1{\bgroup\lw=.071162\lw  
\pdflital{q 14 0 0 14 0 0 cm  
\expandafter\PT\the\lw\space w  
#1 Q}\egroup}
```

# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

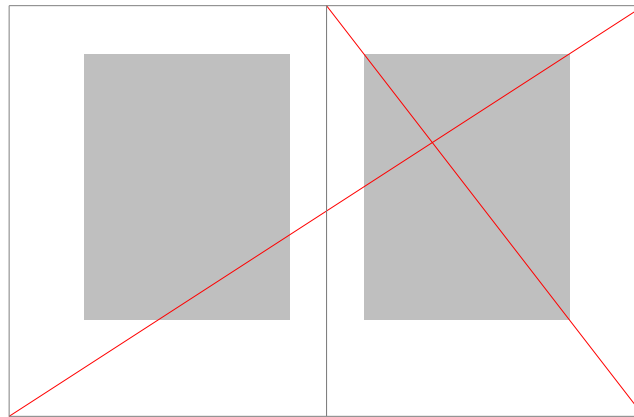
We can design the grid (or select parts)  
toward overall harmony of the page



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

We can design the grid (or select parts)  
toward overall harmony of the page



# Quantum space: designing pages on grids

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## Effective graphical displays

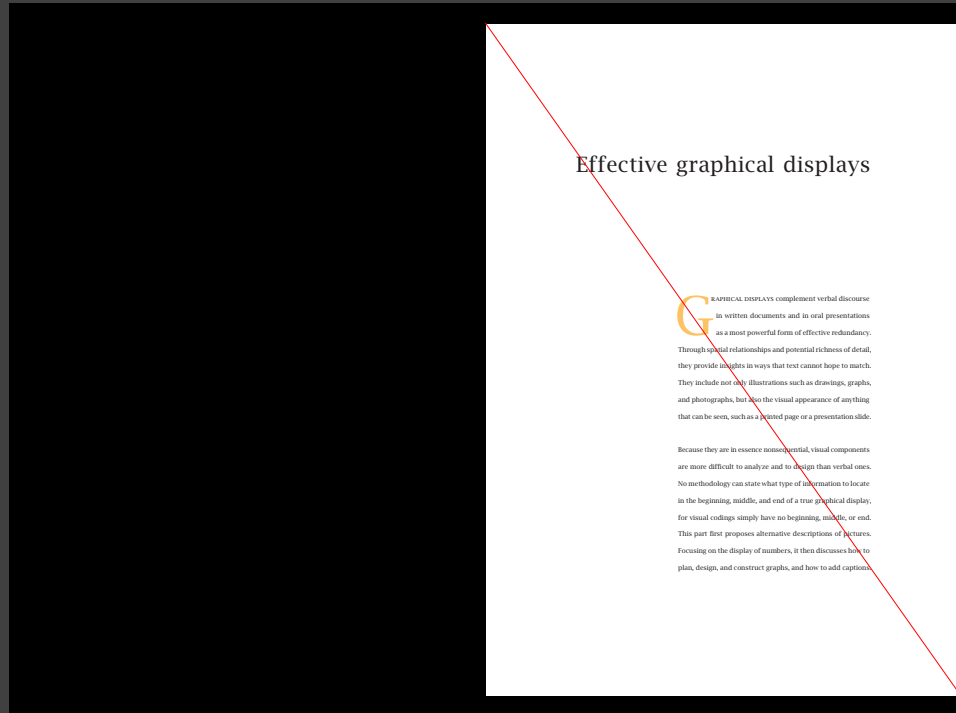
**G**RAPHICAL DISPLAYS complement verbal discourse in written documents and in oral presentations as a most powerful form of effective redundancy.

Through spatial relationships and potential richness of detail, they provide insights in ways that text cannot hope to match. They include not only illustrations such as drawings, graphs, and photographs, but also the visual appearance of anything that can be seen, such as a printed page or a presentation slide.

Because they are in essence nonsequential, visual components are more difficult to analyze and to design than verbal ones. No methodology can state what type of information to locate in the beginning, middle, and end of a true graphical display, for visual codings simply have no beginning, middle, or end. This part first proposes alternative descriptions of pictures. Focusing on the display of numbers, it then discusses how to plan, design, and construct graphs, and how to add captions.

# Quantum space: designing pages on grids

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# Quantum space: designing pages on grids

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We can design the grid (or select parts)  
toward overall harmony of the page

A4 page



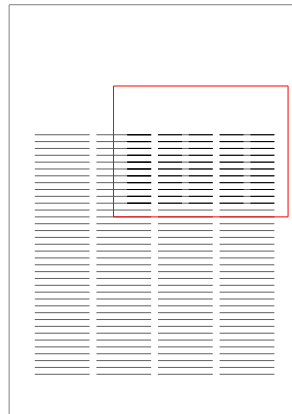


# Quantum space: designing pages on grids

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We can design the grid (or select parts)  
toward overall harmony of the page

A4 page

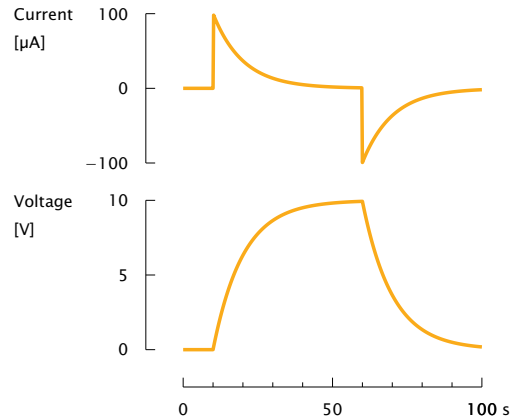


A presentation slide

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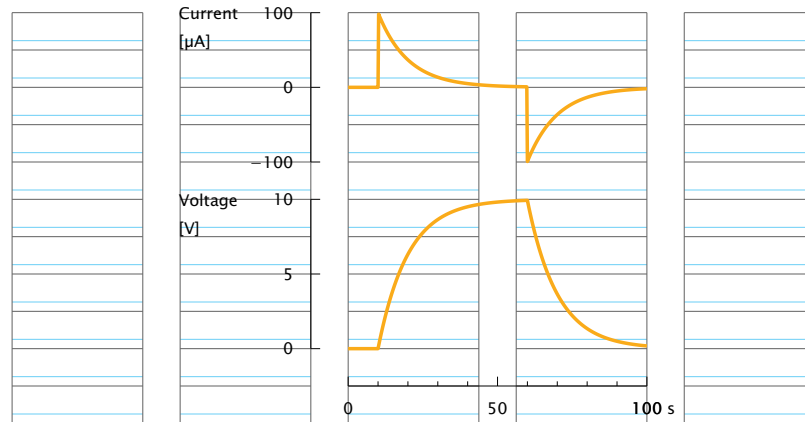
By default, draw lines  
to reveal an evolution



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

By default, draw lines  
to reveal an evolution



# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

To achieve strict alignments,  
we need strict rectangles

# Quantum space: designing pages on grids

TUG | X 004 | Wed 30 Jun 2010

To achieve strict alignments,  
we need strict rectangles

| My three laws of communication

## Quantum space: designing pages on grids

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To achieve strict alignments,  
we need strict rectangles

My three laws of communication

- adapt to your audience
- maximize the signal-to-noise ratio
- use effective redundancy

## Quantum space: designing pages on grids

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## Quantum space: designing pages on grids

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To achieve strict alignments,  
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## Quantum space: designing pages on grids

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To achieve strict alignments,  
we need strict rectangles

Jean-luc's three laws of com

- adapt to your audience
- maximize the signal-to-noise
- use effective redundancy

# Quantum space: designing pages on grids

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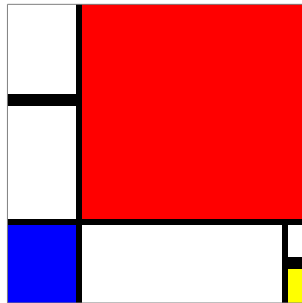
To achieve strict alignments,  
we need strict rectangles



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## Quantum space



René Descartes

Plane coordinates

Albert Einstein

Quantum physics

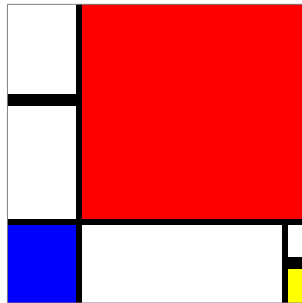
Piet Mondriaan

Strictest harmony

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## Quantum space



Jean-luc Doumont  
[www.principiae.be](http://www.principiae.be)

Rational page layout:  
useful and beautiful?