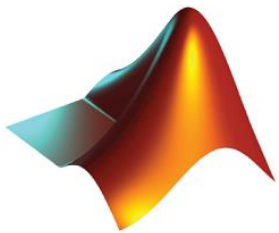
Easy & time-efficient Figure Creation


with PowerPoint, MATLAB, Python

for graduate students

jaegang0626@hanyang.ac.kr

Before creating figures

Check the exact figure-guidelines in the journal's homepage.

- Image file format (e.g., jpg, png, eps, pdf)
- Resolution (e.g., 300 or 600 dpi), maximum file size (e.g., 10 MB)
- Figure width (e.g., 8 & 15 cm for single- & double-column, respectively)
- Recommended font & font size of texts in figures

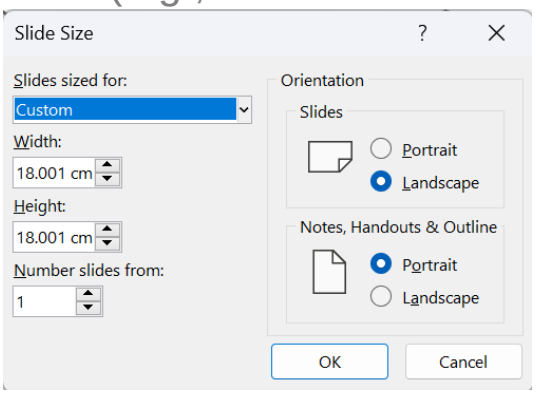
  (e.g., minimum 7pt, sanserif fonts (Arial, Helvetica, etc.))
- Linewidth of graphs and axes (e.g., 1pt), line colors & shapes considering people with visual impairments (Avoid using similar colors in a single graph)
- Font & font size of figure labels (a, b, c, …) (e.g., 9 pt, sanserif font (Arial, Helvetica, etc))

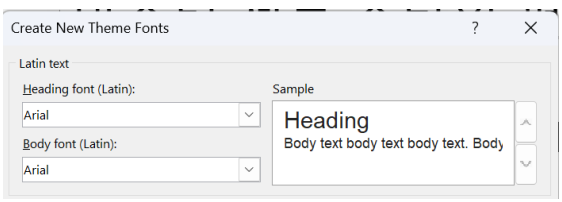
jaegang0626@hanyang.ac.kr

Figure width setting & font, font size, line width setting

- PowerPoint menu: Design → Slide Size → Custom Slide Size
- Insert recommended figure width at the width tab

  (e.g., 8 & 15 cm for single-& double-column, respectively)





Now, The font size & linewidth in PowerPoint will be the same as the ones in the manuscript.

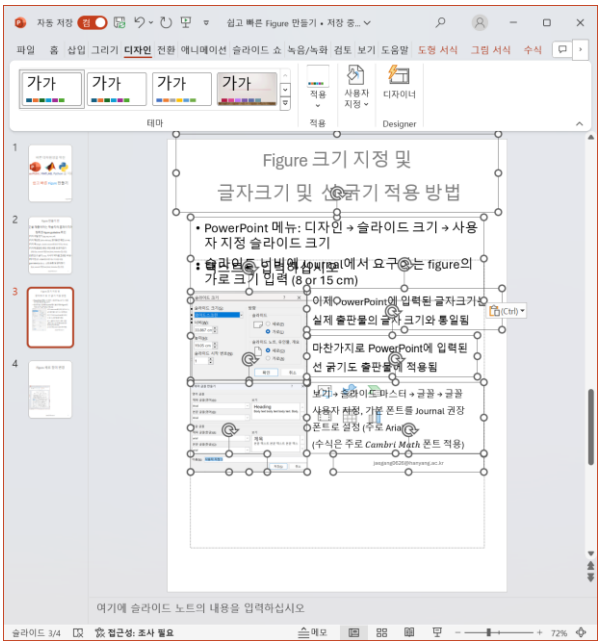
Default font setting

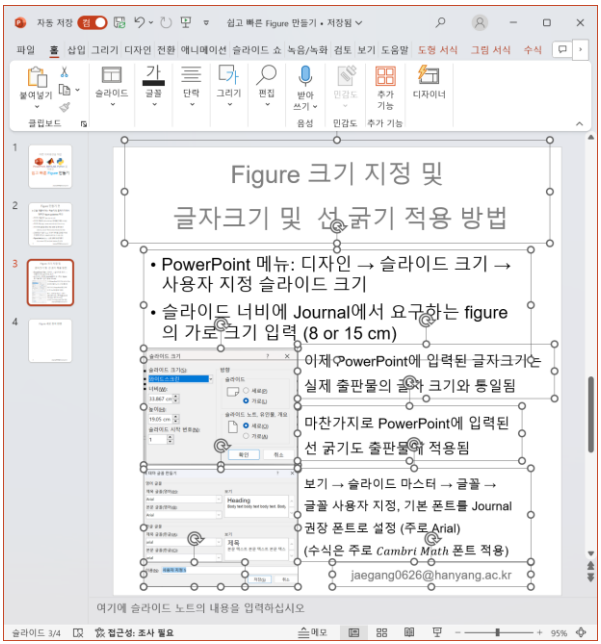
- View → Slide Maser → Fonts → Customize fonts, set the font to recommended font (Normally Arial)
- For Equations use serif fonts (Normally $Cambri\ Math$)

jaegang0626@hanyang.ac.kr

Figure height setting

- Set the height not to remain margins at the top and bottom of the figure
- All the Items on the slide should be cut while changing the height
- Ctrl+A(Select all) → Ctrl+X(Cut) → Change Slide Height → Ctrl+V(Paste)





jaegang0626@hanyang.ac.kr

Creating Graphs using Python

By using matplotlib.pyplot Library, we can set plot parameters

Github link

```
import matplotlib.pyplot as plt
import numpy as np

params = {
    'axes.labelsize':9, # Font size for axis labels
    'axes.titlesize':9, # Font size for the title
    'xtick.labelsize':9, # Font size for x-axis tick labels
    'ytick.labelsize':9, # Font size for y-axis tick labels
    'xtick.direction': 'in', # Direction of tick marks (in, out, inout)
    'ytick.direction': 'in', # Direction of tick marks (in, out, inout)
    'lines.markersize': 3, # Marker size
    'axes.titlepad': 6, # Padding between title and graph
    'axes.labelpad': 4, # Padding between axis label and graph
    'font.size': 9, # Font size
    'font.sans-serif': 'Arial', # Font setting
    'figure.dpi': 300, # Resolution, vector graphics remain sharp regardless of dpi
    'figure.autolayout': True, # Ensures all elements fit inside the figure
    'xtick.top': True, # Show tick marks on the top of the x-axis
    'ytick.right': True, # Show tick marks on the right side of the y-axis
    'xtick.major.size': 2, # Length of major tick marks on the x-axis
    'ytick.major.size': 2, # Length of major tick marks on the y-axis
}
plt.rcParams.update(params)
```

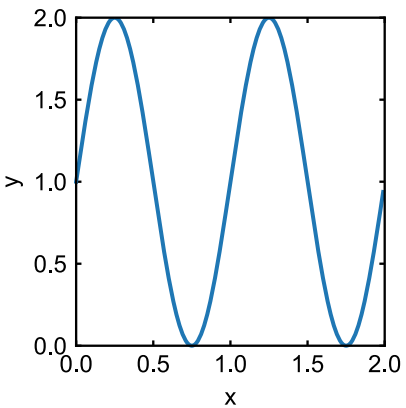

jaegang0626@hanyang.ac.kr

Creating Graphs using Python

Github link

```
fig, ax = plt.subplots(figsize=(6.0 / 2.54, 6.0 / 2.54)) # 6cm x 6cm (1 inch = 2.54 cm)
# Data for plotting
x = np.arange(0.0, 2.0, 0.01)
y = 1 + np.sin(2 * np.pi * x)
plt.plot(x, y)
plt.xlim(0, 2)
plt.ylim(0, 2)
plt.xlabel('x')
plt.ylabel('y')

# If you use plt.show() to view the figure, the image size might not be correct when saving
fig.savefig('temp.svg', transparent=True) # Save the figure as a vector graphic
```



Final graph
6 x 6 cm^2 sized, Arial font, 9 pt

※ The font size and the linewidth will be changed if you resize the figure after importing the SVG file into PowerPoint.

If you need to adjust the figure size, it is recommended to modify the code and re-export the figure.

jaegang0626@hanyang.ac.kr

Creating Graphs using MATLAB

Set plot parameters and save it as a svg file.

Github link

```
set(0,'defaultAxesFontName','Arial') % set default font as Arial
set(0,'defaultAxesFontSize',9) % set default font size 9
set(0,'DefaultLineLineWidth',1) % set default data-linewidth 1
set(0,'DefaultAxesLineWidth',1) % set default Axes-linewidth 1

close all; % close all the figure windows
figure; % new figure
hold on; % overlap multiple graphs
x = linspace(0,2*pi, 101); y1 = sin(x); y2 = cos(x);
plot(x, y1, Color='r', LineStyle='-') % plot sin(x)
plot(x, y2,Color='b', LineStyle='-') % plot cos(x)
legend(["sin(x)", "cos(x)"], location="southwest") % plot legend
xlim([0, 2*pi]); % set x limit values
ylim([-1,1]); % set y limit values
xticks(linspace(0,2*pi,5)) % set x tick positions
xticklabels({'0', '\pi/2', '\pi', '3\pi/2', '2\pi'}) % set x tick labels
yticks(linspace(-1,1,3)) % set y tick positions
xlabel("x", "FontSize",9) % set x axis label
ylabel("y", "FontSize",9) % set y axis label
box on; % set box
plot_size_in_cm(7.5,4) % make plot in cm size
saveas(gcf, 'example.svg', 'svg') % save as svg file

function plot_size_in_cm(x_width, y_width)
cm_to_pt = 37.8; % constant to make figure exact size in cm scale
% set figure position and size
set(gcf, 'position', [500 100 x_width*cm_to_pt y_width*cm_to_pt]);
end
```

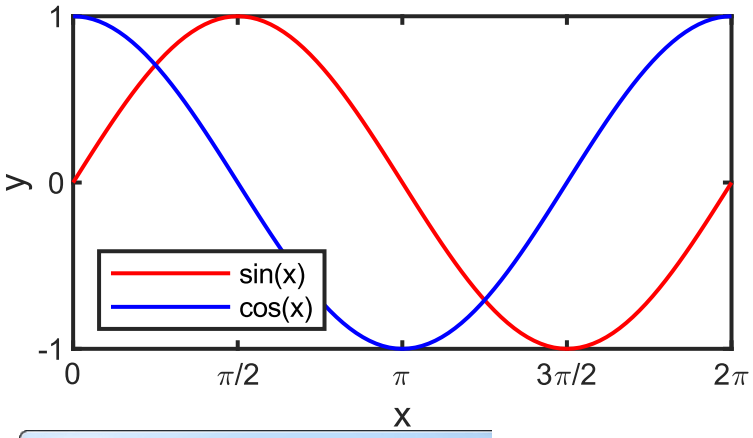
plot parameters setting

figure size setting

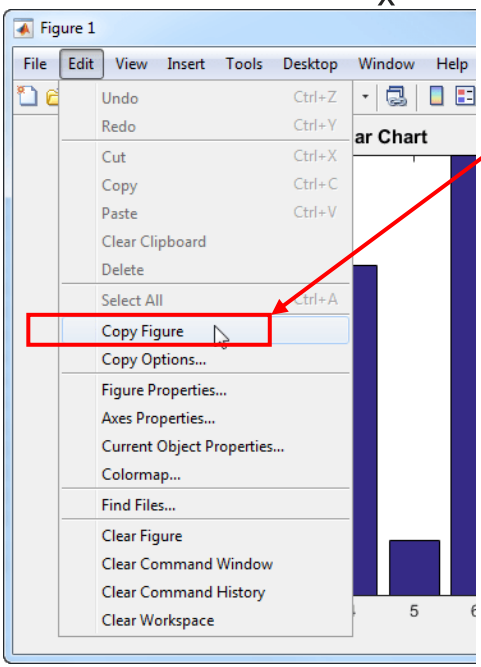
jaegang0626@hanyang.ac.kr

Creating Graphs using MATLAB

Github link



Final graph
7.5 x 4 cm^2 sized
Arial, 9 pt
linewidth 1pt



or click Edit -> Copy Figure
and Paste it into PowerPoint

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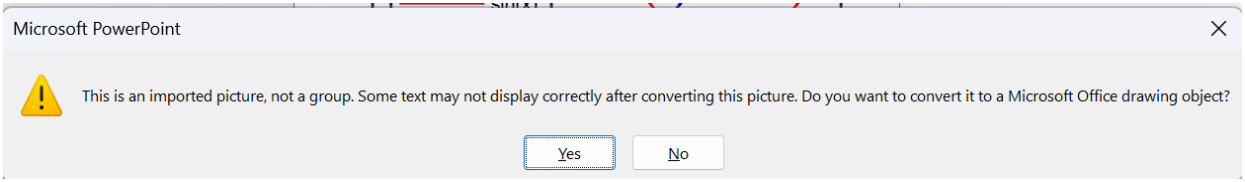
If you need to adjust the figure size, it is recommended to modify the code and re-export the figure.

jaegang0626@hanyang.ac.kr

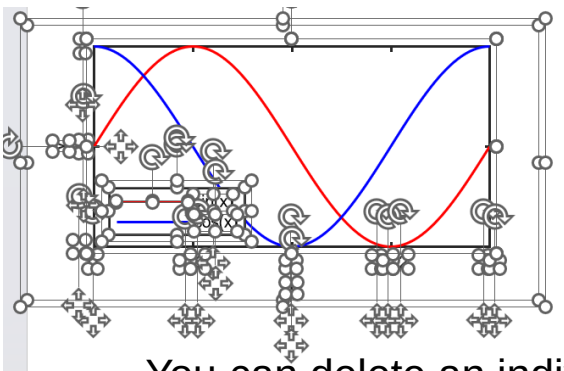
Breaking SVG figure into vector graphic objects

Click on the figure from the SVG file and press Ctrl + Shift + G

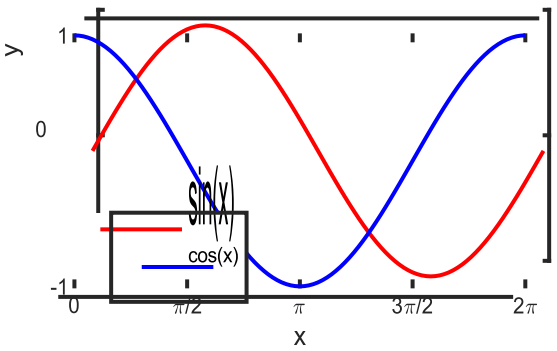
If a warning dialog appears, click ‘Yes’.



If you press Ctrl + Shift + G, the figure will be broken down into individual vector graphic objects.



The vector graphic objects can be edited individually.



You can delete an individual vector graphic object and add new lines and texts on it.

jaegang0626@hanyang.ac.kr

Saving the figure with various file formats

- Image format (png, jpg, jpeg, bmp, etc.)
  - Change the export resolution setting of PowerPoint
  - then export it as an image file.
- PDF format
  - If the figure includes only vector objects, save it as pdf file using PowerPoint.
  - If the figure includes image file, save it as image file and convert it into pdf file.
- EPS format
  - If the figure includes only vector objects, save it as pdf file and convert it into EPS file.
  - If the figure includes image file, save it as image file and convert it into EPS file.
- You can use Inkscape and any other online image converting sites to convert the file format.

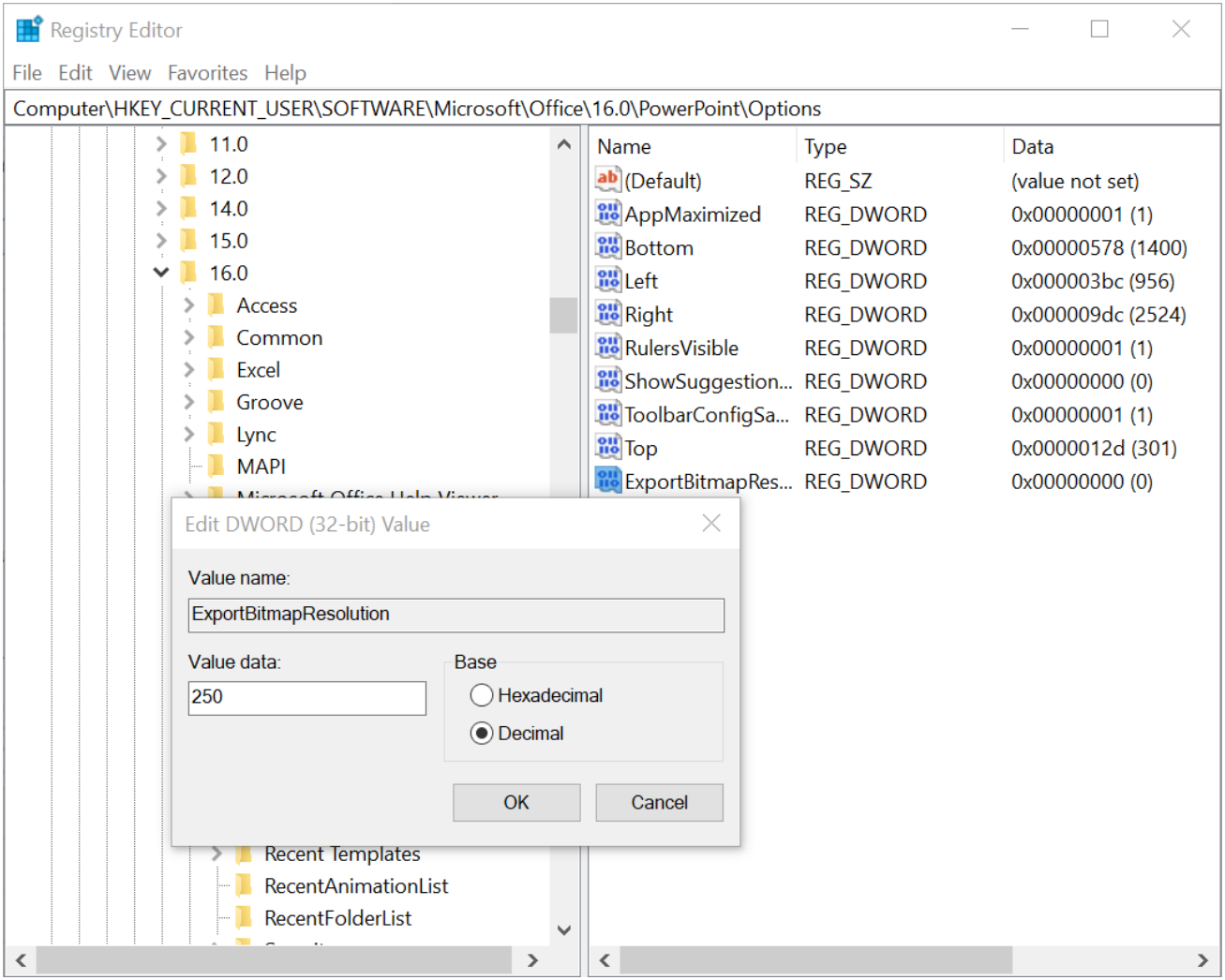
jaegang0626@hanyang.ac.kr

Export resolution setting of PowerPoint

Microsoft documents for the resolution setting

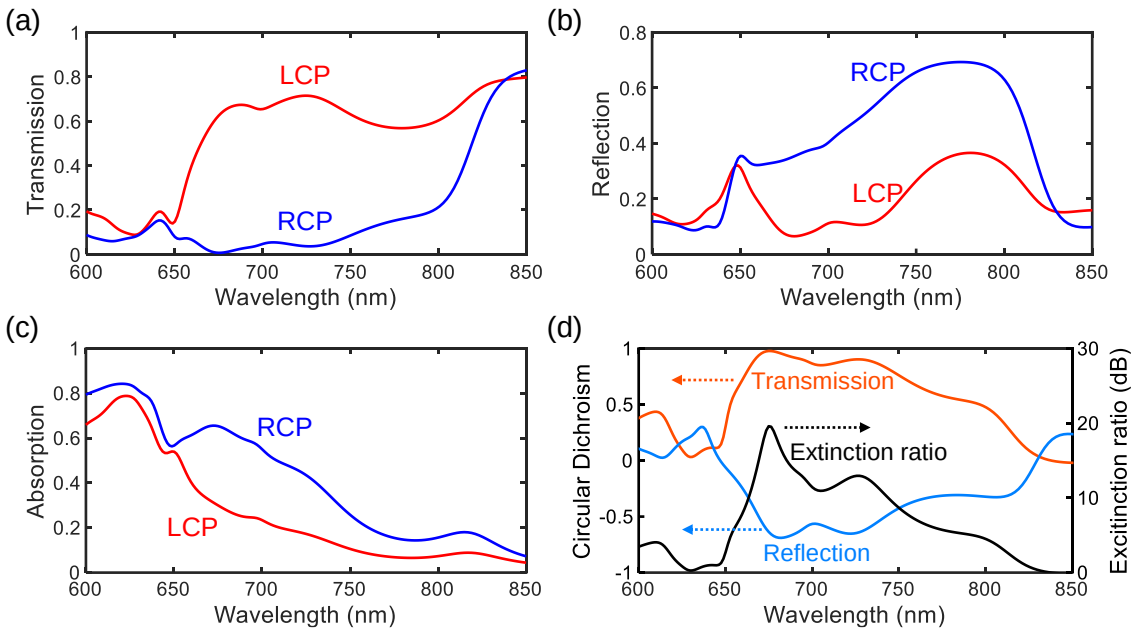
- Open Windows regedit → insert the adress
- “HKEY_CURRENT_USER\Software\Microsoft\Office\16.0\PowerPoint\Options” (for PowerPoint 2016, 2019, Office 365)
- Menu: Edit→New→DWORD(32-bit) Value → Insert filename “ExportBitmapResolution”
- Insert DPI value at the file (300~600 dpi)

jaegang0626@hanyang.ac.kr



jaegang0626@hanyang.ac.kr

Example: figure with only vector graphic objects



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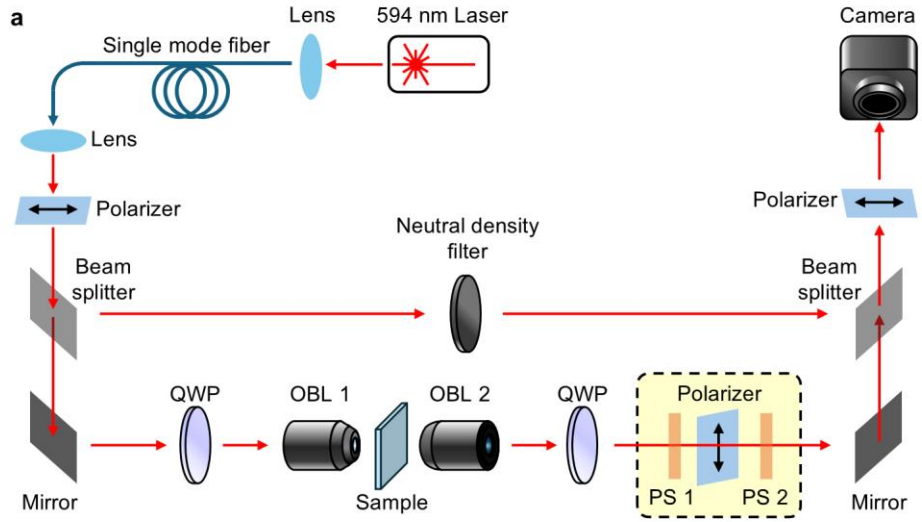
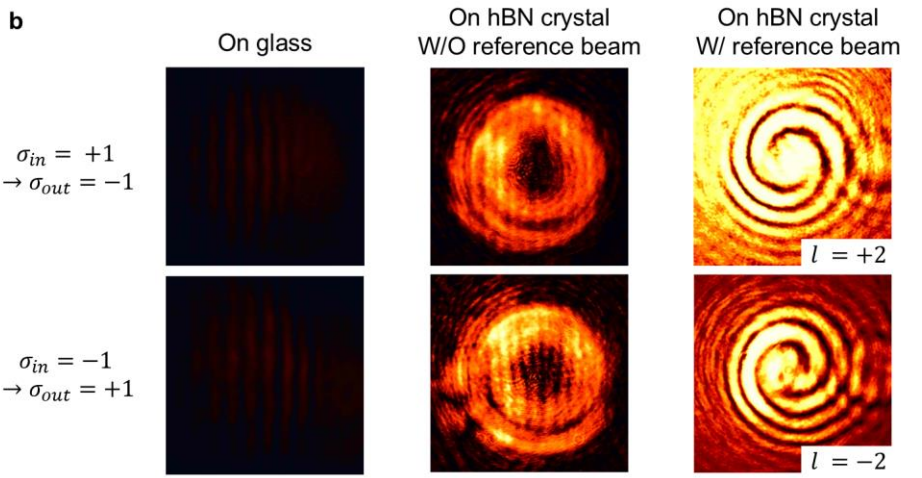
Example: figure with images





jaegang0626@hanyang.ac.kr