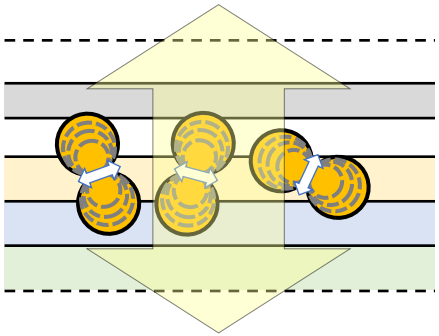
Internal Light Source-Power Density

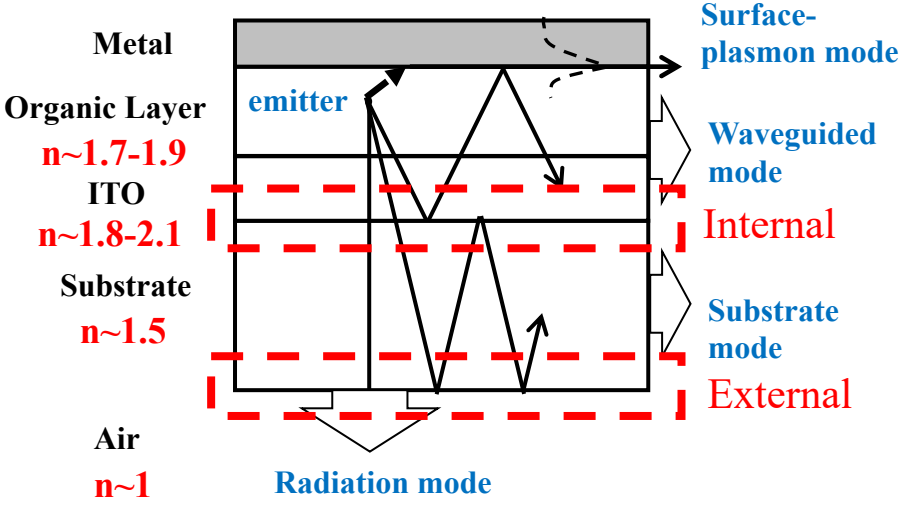
-PowerDensityCmd.pyc

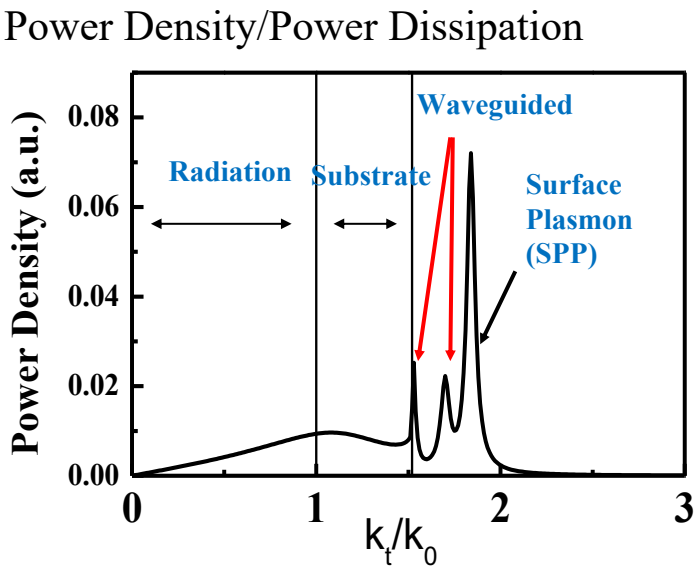
Author: Wei-Kai Lee



Objective

- To calculate the power density of the device.





How to execute the calculator

python: windows
python3: mac, linux

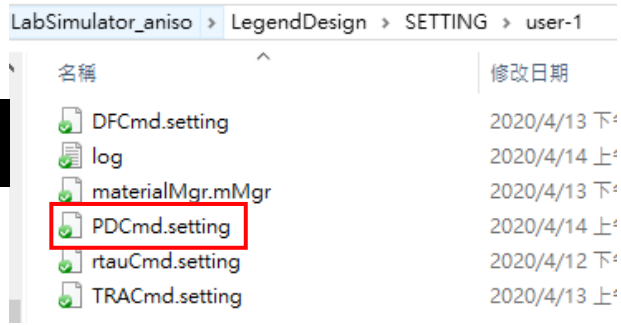
```
h>python PowerDensityCmd.pyc
```

Execution file

```
>>> Please insert username : user-1
```

Type user name

```
Power Density Setting is not built in ../../SETTING/user-1
Now saving the default power density setting.
```



Help

```
>>> ?

User Control Command
========================================
1. Settting Command:
changeUser          exit

Material Manager Command
========================================
1. Settting Command:
printMgr            saveMgr

Structure/Structure List Command
========================================
1. Structure List Command:
ReadStructListPath   ReadStructListName
SaveStructListPath   SaveStructListName
readStructList       saveStructList

2. Structure Command:
ReadStructPath       ReadStructName
SaveFilePath         SaveFileName
readStruct           deleteStruct

3. Print Information Command:
printStructInfo      printStructSettingInfo
printListInfo

4. Result Command:
ResultFilePath       ResultFileName
deleteResult
save_run_time_result_Bool
resetSN
```

Help

```
Power Density Command
**** Notice the mode interference power !!!
=========================================
1. Settting Command:
SettingFilePath      SettingFileName
setDefaultSetting    printPDInfo
loadPDSETTING        savePDSETTING

2. Power Density in kxky domain:
kxko                 kyko                ----Parameter
runPD_kxky           plotPDvskxky
plotPDkxkyContour    writekxkyMatrix

3. Power Density in k polar domain:
ktko                 Thetakt             ----Parameter
runPD_PolarInK       plotPDvskPolar
plotPDPolarContour   writekPolarMatrix

4. Power Density z in kxky domain:
kxko                 kyko                z                   ----Parameter
runPDz_kxky          plotPDvsZ_kxky

5. Power Density z in k polar domain:
ktko                 Thetakt             z                   ----Parameter
runPDz_PolarInK      plotPDvsZ_kPolar

6. Incoherence Layer Power Density in kxky domain:
kxko                 kyko                ----Parameter
runInCoPD_kxky       plotInCoPDvskxky
plotInCoPDkxkyContour writeInCokxkyMatrix

7. Incoherence Layer Power Density in k polar domain:
ktko                 Thetakt             ----Parameter
runInCoPD_PolarInK   plotInCoPDvskPolar
plotInCoPDPolarContour writeInCokPolarMatrix
```

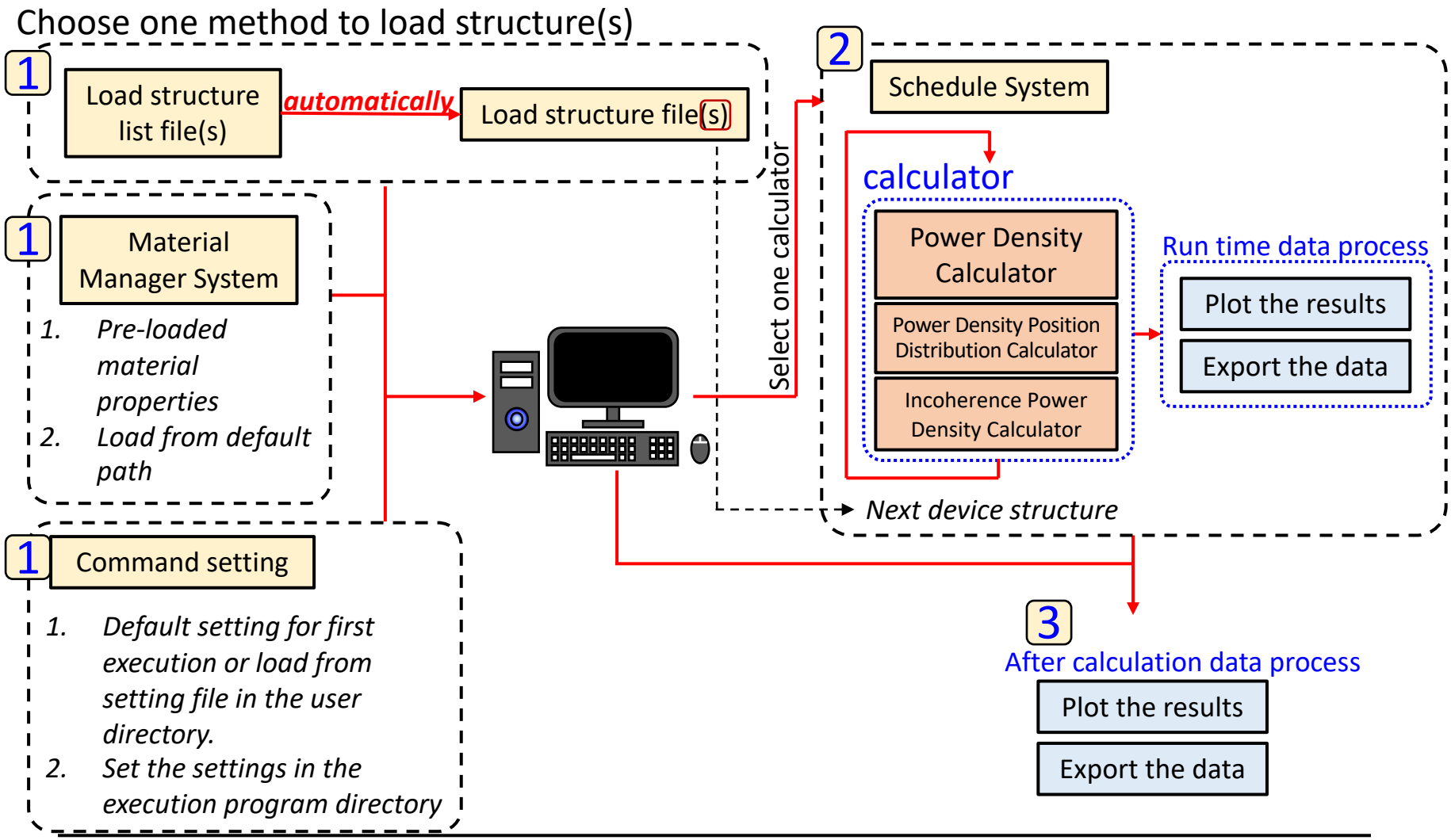
Help

```
8. Write Bool:
--- Mode (related to Power Density/ Power Density z) ---
write_TotalPowerBool
write_ForwardPowerBool          write_BackwardPowerBool
write_M1M3PowerBool             write_M2M4PowerBool
write_M1PowerBool               write_M2PowerBool
write_M3PowerBool               write_M4PowerBool
--- Region (Only related to Power Density) ---
write_EMLBool                   ----at the emission position
write_EML_zPlusBool             ----at the position just above the emission position
write_EML_zMinusBool            ----at the position just below the emission position
write_SEMI_zPlusBool            ----at the position just above the 1st interface of the device
write_SEMI_zMinusBool           ----at the position just below the last interface of the device

9. Write Matrix Bool:
--- Mode (related to Power Density/ Power Density z/ Incoherence Power Density) ---
writeMatrix_TotalPowerBool
writeMatrix_ForwardPowerBool    writeMatrix_BackwardPowerBool
writeMatrix_M1M3PowerBool       writeMatrix_M2M4PowerBool
writeMatrix_M1PowerBool         writeMatrix_M2PowerBool
writeMatrix_M3PowerBool         writeMatrix_M4PowerBool
--- Region (Only related to Power Density) ---
writeMatrix_EMLBool             ----at the emission position
writeMatrix_EML_zPlusBool       ----at the position just above the emission position
writeMatrix_EML_zMinusBool      ----at the position just below the emission position
writeMatrix_SEMI_zPlusBool      ----at the position just above the 1st interface of the device
writeMatrix_SEMI_zMinusBool     ----at the position just below the last interface of the device
```

Help

```
10. Plot Bool:
changefigshowBool
--- Mode (related to Power Density/ Power Density z/ Incoherence Power Density) ---
plot_TotalPowerBool
plot_ForwardPowerBool          plot_BackwardPowerBool
plot_M1M3PowerBool             plot_M2M4PowerBool
plot_M1PowerBool               plot_M2PowerBool
plot_M3PowerBool               plot_M4PowerBool
--- Region (Only related to Power Density) ---
plot_EMLBool                   ----at the emission position
plot_EML_zPlusBool             ----at the position just above the emission position
plot_EML_zMinusBool            ----at the position just below the emission position
plot_SEMI_zPlusBool            ----at the position just above the 1st interface of the device
plot_SEMI_zMinusBool           ----at the position just below the last interface of the device

11. Run Time Bool:
runtime_plot
--- (Only related to Power Density/ Incoherence Power Density)) ---
runtime_write_matrix runtime_contourplot
```

Calculating Workflow



Default Setting

```
>>> printPDInfo

Setting file path : ../../SETTING/user-1
Setting file name : PDCmd.setting
kt/ko : 0.00000:0.10000:1.00000
Theta in kt/ko domain : 0.00000:10.00000:360.00000
kx/ko : -1.00000:0.10000:1.00000
ky/ko : -1.00000:0.10000:1.00000
z(nm) : -50.00000:1.00000:50.00000
Save Run Time Result  : True
Run Time Write Matrix : False
Run Time Plot         : False
Run Time Contour Plot : False

Plot Region Bool:
     EML                  : True (EMLz+ add EMLz- )
     EML(EMLz+)           : False (at the position just above emitting position)
     EML(EMLz-)           : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Plot Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : False
     -z    (M3+M4)        : False
     M1                   : False
     M2                   : False
     M3                   : False
     M4                   : False
Write Region Bool:
     EML                  : True (EMLz+ add EMLz- )
     EML(EMLz+)           : True (at the position just above emitting position)
     EML(EMLz-)           : True (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Write Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : True
     -z    (M3+M4)        : True
     M1                   : True
     M2                   : True
     M3                   : True
     M4                   : True
WriteMatrix Region Bool:
     EML                  : True (EMLz+ add EMLz- )
     EML(EMLz+)           : False (at the position just above emitting position)
     EML(EMLz-)           : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
WriteMatrix Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : False
     -z    (M3+M4)        : False
     M1                   : False
     M2                   : False
```

Setting

```
kt/ko : 0.00000:0.10000:1.00000
Theta in kt/ko domain : 0.00000:10.00000:360.00000
```

kt/ko and θ_{kt}setting method

```
<PDCmd> help ktko
Set the kt/ko. (Empty for delete setting)
[Usage] ktko [ktko] - single value, start:spacing:end, (v1,v2,v3,v4)

<PDCmd> help Thetakt
Set the polar angle in kx ky domain.
[Usage] Thetakt [theta] - single value, start:spacing:end, (v1,v2,v3,v4)
```

Setting

```
kx/ko : -1.00000:0.10000:1.00000
ky/ko : -1.00000:0.10000:1.00000
```

kx/ko and ky/ko setting method

```
<PDCmd> help kxko
Set the kx/ko. (Empty for delete setting)
[Usage] kxko [kxko] - single value, start:spacing:end, (v1,v2,v3,v4)

<PDCmd> help kyko
Set the ky/ko. (Empty for delete setting)
[Usage] kyko [kyko] - single value, start:spacing:end, (v1,v2,v3,v4)
```

```
z(nm) : -50.00000:1.00000:50.00000
```

z setting method

```
<PDCmd> help z
Set the simulation position z. (Empty for delete setting)
[Usage] z [z] - single value, start:spacing:end, (v1,v2,v3,v4)
```

Run-Time Setting

```
Save Run Time Result  : True
```

Whether to save the data in the memory after the calculation. If the user would like to execute plot or other data manipulation commands, the save-run-time-result bool should be “True”. However, the user should notice the memory usage when scanning a lot of parameters.

```
Run Time Write Matrix : False
```

Whether to write the results when calculation.

```
Run Time Write Matrix : False
Run Time Plot         : False
Run Time Contour Plot : False
```

Whether to write the results when calculation.

Plot Setting

```
Plot Region Bool:
     EML                    : True (EMLz+ add EMLz- )
     EML(EMLz+)             : False (at the position just above emitting position)
     EML(EMLz-)             : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Plot Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)    : True
     +z    (M1+M2)          : False
     -z    (M3+M4)          : False
     M1                     : False
     M2                     : False
     M3                     : False
     M4                     : False
Write Region Bool:
     EML                    : True (EMLz+ add EMLz- )
     EML(EMLz+)             : True (at the position just above emitting position)
     EML(EMLz-)             : True (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Write Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)    : True
     +z    (M1+M2)          : True
     -z    (M3+M4)          : True
     M1                     : True
     M2                     : True
     M3                     : True
     M4                     : True
WriteMatrix Region Bool:
     EML                    : True (EMLz+ add EMLz- )
     EML(EMLz+)             : False (at the position just above emitting position)
     EML(EMLz-)             : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
WriteMatrix Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)    : True
     +z    (M1+M2)          : False
     -z    (M3+M4)          : False
     M1                     : False
     M2                     : False
```

Calculate Power Density

Bottom-emitting OLED

sfile-1.txt

	MATERIAL	THICKNESS(nm)
2	air	X
3	Al	120.000000
4	LiF	1.000000
5	B3PYMPM	50
6	CBP	20.000000
7	TAPC	50
8	cito	80
9	glass	X

Thick metal

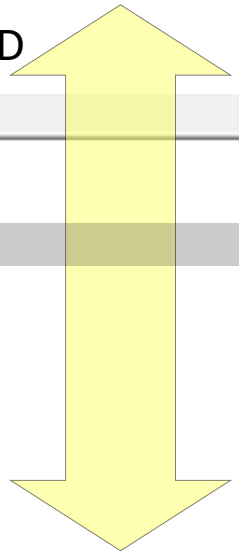
```
wavelength(nm) : 480.0:10.0:600.0
EML :
    Layerno                 : 5
    Position(nm)            : 10.000000
    ratio                   : 1.000000
    QY                      : 1.000000
    Fluorescence            : cbp_irppy2acac
    DOF                     : cbp_irppy2acac
```

structureList-PDCmd1.txt

Name	readfilename	readfilepath	savefilename	
#s1	sfile-1.txt	./Example/structure/Convention	sfile-1	../../Example/PDCm

Calculate Power Density

Transparent/ Double-emitting OLED



sfile-1.txt

```
          MATERIAL                    THICKNESS(nm)
               air                                X
                Al                          10:5:20
               LiF                         1.000000
            B3PYMPM                               50
               CBP                        20.000000
              TAPC                                20
              cito                              50
             glass                                X


wavelength(nm) : 450:10:650.0
EML :
    Layerno                    : 5
    Position(nm)               : 10.000000
    ratio                      : 1.000000
    QY                         : 1.000000
    Fluorescence               : cbp_irppy2acac
    DOF                        : cbp_irppy2acac
```

Thin metal

structureList-PDCmd1.txt

```
Name   readfilename                    readfilepath          savefilename
#Ts1   sfile-1.txt      ./Example/structure/Transparent          sfile-1          ../../Exa
```

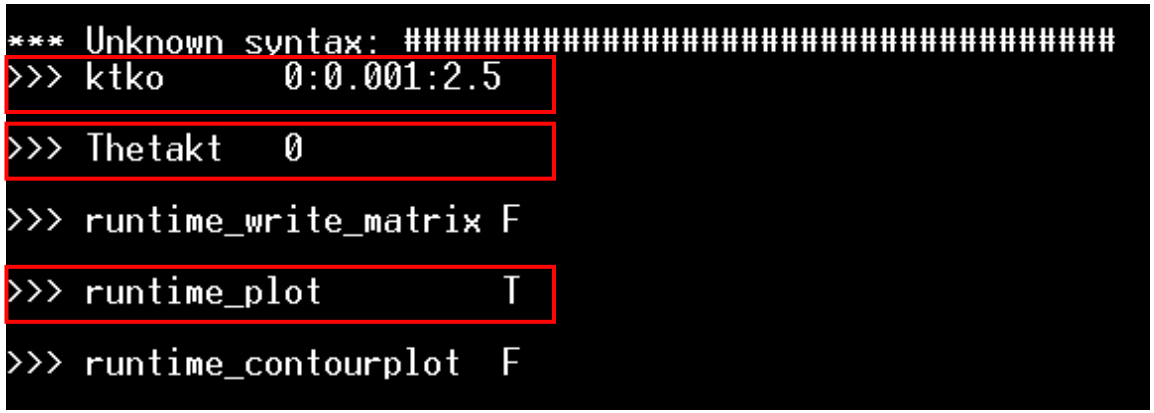
Calculate Power Density at EML

```
>>> changefigshowBool F

>>> save_run_time_result_Bool F

>>> ReadStructListPath  ./Example/structure/Convention

>>> ReadStructListName  structureList-PDCmd1.txt

>>> readStructList

Now reading structure list file ./Example/structure/Convention\structureList-PDCmd1.txt
  No./Name       filename        savefilename  CommandID  Check                    readfilepath
-------------------------------------------------------------------------------------------------------------
       #s1    sfile-1.txt             sfile-1       0.0      X  ./Example/structure/Convention  ../../Example/PDCmd-1

Structure file reading...
-------------------------------------------------------------------------------------------
Now reading structure file ./Example/structure/Convention\sfile-1.txt

>>> ReadStructListPath  ./Example/structure/Transparent

>>> ReadStructListName  structureList-PDCmd1.txt

>>> readStructList

Now reading structure list file ./Example/structure/Transparent\structureList-PDCmd1.txt
  No./Name       filename        savefilename  CommandID  Check                    readfilepath
-------------------------------------------------------------------------------------------------------------
      #Ts1    sfile-1.txt             sfile-1       0.0      X  ./Example/structure/Transparent  ../../Example/PDCmd-

Structure file reading...
-------------------------------------------------------------------------------------------
Now reading structure file ./Example/structure/Transparent\sfile-1.txt
```

Calculate Power Density at EML

```
>>> printStructInfo

****************************************
Name: #s1
[#]   Material            Thickness(nm)
----------------------------------------
[1]   air                 X
[2]   Al                  120.0
[3]   LiF                 1.0
[4]   B3PYMPM             50.0
[5]   CBP                 20.0
[6]   TAPC                50.0
[7]   cito                80.0
[8]   glass               X

wavelength(nm) : 480.00000:10.00000:600.00000

EML   Fluorescence    DOF             Position(nm)    PLQY            Ratio
-------------------------------------------------------------------------------
[5]   cbp_irppy2acac  cbp_irppy2acac  10.0            1.0             1.0
Device number : 1


****************************************
Name: #Ts1
[#]   Material            Thickness(nm)
----------------------------------------
[1]   air                 X
[2]   Al                  10.00000:5.00000:20.00000
[3]   LiF                 1.0
[4]   B3PYMPM             50.0
[5]   CBP                 20.0
[6]   TAPC                20.0
[7]   cito                50.0
[8]   glass               X

wavelength(nm) : 450.00000:10.00000:650.00000

EML   Fluorescence    DOF             Position(nm)    PLQY            Ratio
-------------------------------------------------------------------------------
[5]   cbp_irppy2acac  cbp_irppy2acac  10.0            1.0             1.0
Device number : 3
```

Calculate Power Density at EML



Calculate Power Density at EML

```
>>> printPDInfo

Setting file path : ../../SETTING/user-1
Setting file name : PDCmd_setting
kt/ko : 0.00000:0.00100:2.50000
Theta in kt/ko domain : 0.0
kx/ko : -1.00000:0.10000:1.00000
ky/ko : -1.00000:0.10000:1.00000
z(nm) : -50.00000:1.00000:50.00000
Save Run Time Result  : False
Run Time Write Matrix : False
Run Time Plot         : True
Run Time Contour Plot : False

Plot Region Bool:
     EML                    : True (EMLz+ add EMLz- )
     EML(EMLz+)             : False (at the position just above emitting position)
     EML(EMLz-)             : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Plot Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)    : True
     +z    (M1+M2)          : False
     -z    (M3+M4)          : False
     M1                     : False
     M2                     : False
     M3                     : False
     M4                     : False
Write Region Bool:
     EML                    : True (EMLz+ add EMLz- )
     EML(EMLz+)             : True (at the position just above emitting position)
     EML(EMLz-)             : True (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
```

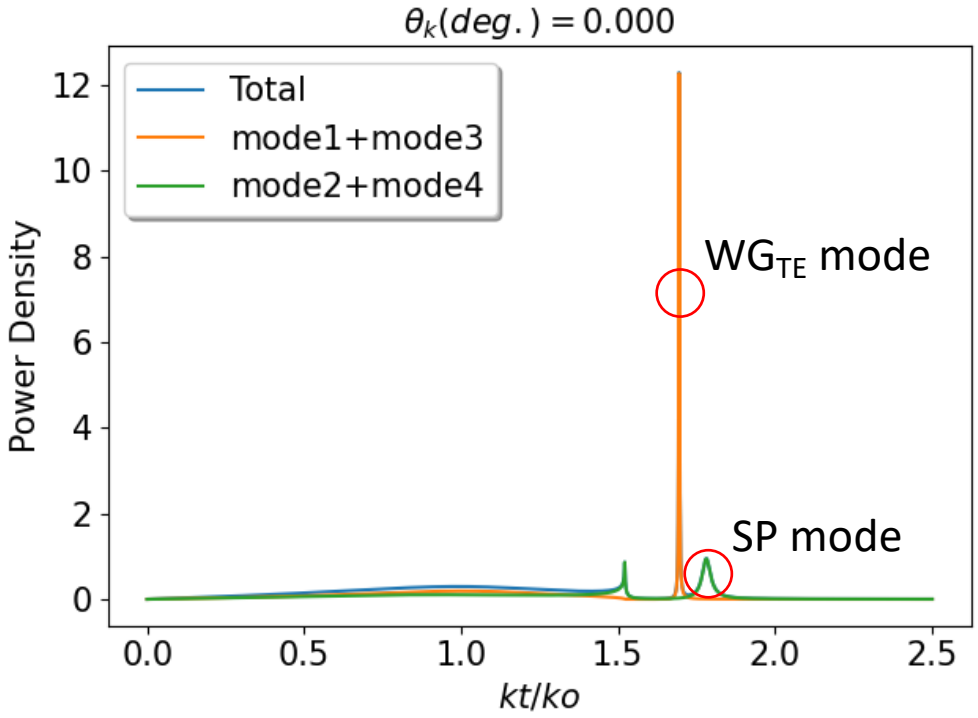
Calculate Power Density at EML

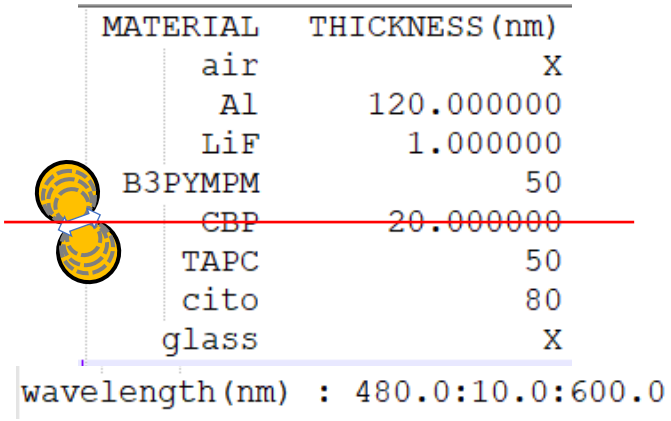
```
Write Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : True
     -z    (M3+M4)        : True
     M1                   : True
     M2                   : True
     M3                   : True
     M4                   : True
WriteMatrix Region Bool:
     EML                  : True (EMLz+ add EMLz- )
     EML(EMLz+)           : False (at the position just above emitting position)
     EML(EMLz-)           : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
WriteMatrix Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : False
     -z    (M3+M4)        : False
     M1                   : False
     M2                   : False
     M3                   : False
     M4                   : False
Figure Show Bool : False

>>> runPD_PolarInK

Now running structure (#1/#2) #s1 ...
|Device-#13/#13|(100%)>>>>>>>>>>>>>>>>>>>>|Elapsed:0day(s)/0hr(s)/0min(s)/26sec(s)
Now running structure (#2/#2) #Ts1 ...
|Device-#63/#63|(100%)>>>>>>>>>>>>>>>>>>>>|Elapsed:0day(s)/0hr(s)/2min(s)/3sec(s)
>>> ########################################
```

Data at EML

Bottom-emitting OLED

480 nm

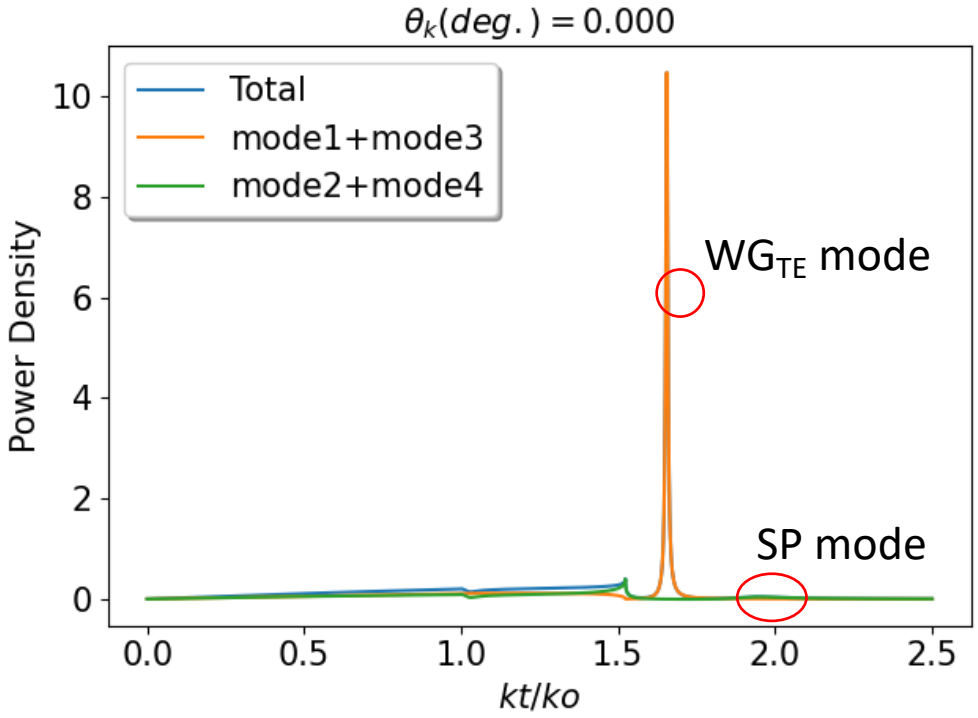


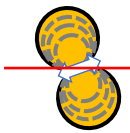


Data at EML

Transparent/ Double-emitting OLED

480 nm





MATERIAL	THICKNESS(nm)
air	X
Al	10
LiF	1.000000
B3PYMPM	50
CBP	20.000000
TAPC	20
cito	50
glass	X

wavelength(nm) : 480.0:10.0:600.0

Calculate Power Density at EML

```
*** Unknown syntax: ########################################
>>> kxko      0:0.01:2.5
>>> kyko      0:0.01:1
>>> runtime_write_matrix T
>>> runtime_plot         F
>>> runtime_contourplot  T
```

Calculate Power Density at EML

```
>>> printPDInfo

Setting file path : ../../SETTING/user-1
Setting file name : PDCmd.setting
kt/ko : 0.00000:0.00100:2.50000
Theta in kt/ko domain : 0 0
kx/ko : 0.00000:0.01000:2.50000
ky/ko : 0.00000:0.01000:1.00000
z(nm) : -50.00000:1.00000:50.00000
Save Run Time Result  : False
Run Time Write Matrix : True
Run Time Plot         : False
Run Time Contour Plot : True

Plot Region Bool:
     EML                   : True (EMLz+ add EMLz- )
     EML(EMLz+)            : False (at the position just above emitting position)
     EML(EMLz-)            : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Plot Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)   : True
     +z    (M1+M2)         : False
     -z    (M3+M4)         : False
     M1                    : False
     M2                    : False
     M3                    : False
     M4                    : False
Write Region Bool:
     EML                   : True (EMLz+ add EMLz- )
     EML(EMLz+)            : True (at the position just above emitting position)
     EML(EMLz-)            : True (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Write Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)   : True
     +z    (M1+M2)         : True
     -z    (M3+M4)         : True
     M1                    : True
     M2                    : True
     M3                    : True
     M4                    : True
```

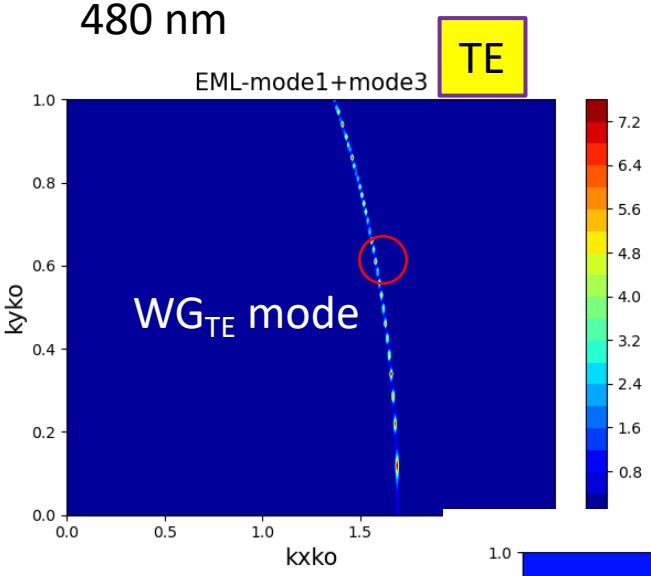
Calculate Power Density at EML

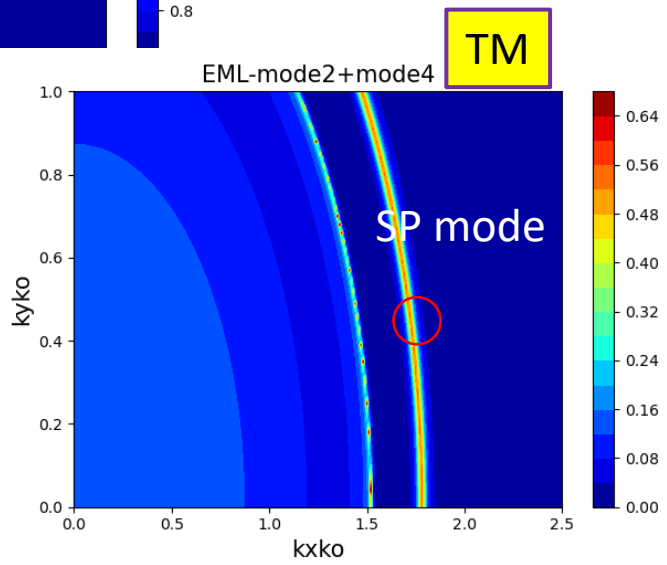
```
WriteMatrix Region Bool:
     EML                    : True (EMLz+ add EMLz- )
     EML(EMLz+)             : False (at the position just above emitting position)
     EML(EMLz-)             : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
WriteMatrix Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : False
     -z    (M3+M4)        : False
     M1                   : False
     M2                   : False
     M3                   : False
     M4                   : False
Figure Show Bool : False

>>> runPD_kxky

Now running structure (#1/#2) #s1 ...
|Device-#13/#13|(100%)>>>>>>>>>>>>>>>>>>>>|Elapsed:0day(s)/0hr(s)/3min(s)/13sec(s)
Now running structure (#2/#2) #Ts1 ...
|Device-#63/#63|(100%)>>>>>>>>>>>>>>>>>>>>|Elapsed:0day(s)/0hr(s)/15min(s)/49sec(s)
>>> deleteStruct
```

Data at EML

Bottom-emitting OLED

480 nm





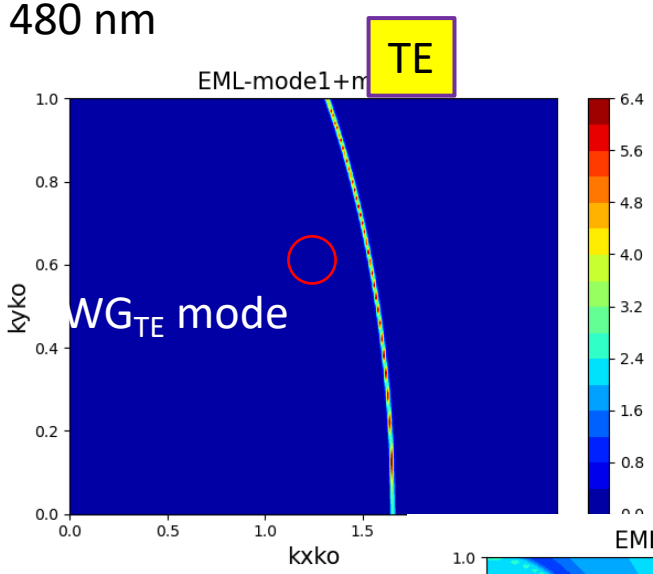
MATERIAL	THICKNESS(nm)
air	X
Al	120.000000
LiF	1.000000
B3PYMPM	50
CBP	20.000000
TAPC	50
cito	80
glass	X

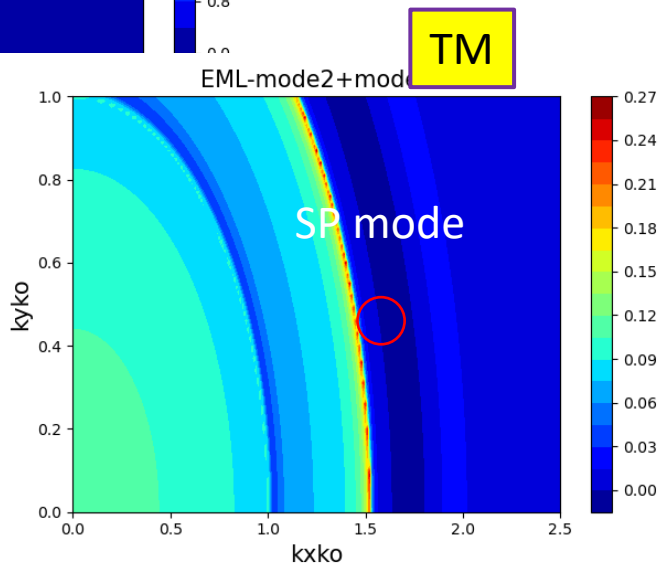
wavelength(nm) : 480.0:10.0:600.0

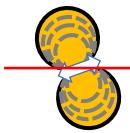
Data at EML

Transparent/ Double-emitting OLED

480 nm







MATERIAL	THICKNESS(nm)
air	X
Al	10
LiF	1.000000
B3PYMPM	50
CBP	20.000000
TAPC	20
cito	50
glass	X

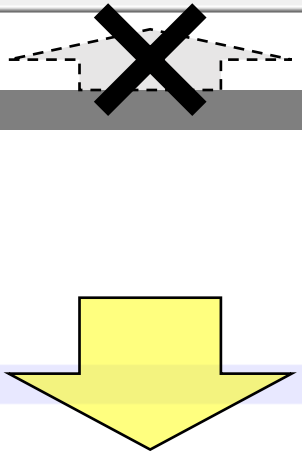
wavelength(nm) : 480.0:10.0:600.0

Calculate Power Density

Bottom-emitting OLED

sfile-1.txt

	MATERIAL	THICKNESS(nm)
1		
2	air	X
3	Al	120.000000
4	LiF	1.000000
5	B3PYMPM	50
6	CBP	20.000000
7	TAPC	50
8	cito	80
9	glass	X
10		
11		
12		
13		
14	wavelength(nm) : 480.0:10.0:600.0	
15	EML :	
16	Layerno : 5	
17	Position(nm) : 10.000000	
18	ratio : 1.000000	
19	QY : 1.000000	
20	Fluorescence : cbp_irppy2acac	
21	DOF : cbp_irppy2acac	



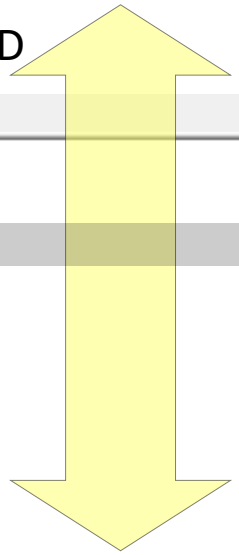
Thick metal

eList-PDzCmd1.txt

Name	readfilename	readfilepath	savefilename	
#s1	sfile-1.txt	./Example/structure/Convention	sfile-1	../../Example/PDzCmd-1/C

Calculate Power Density

Transparent/ Double-emitting OLED



sfile-1.txt

	MATERIAL	THICKNESS(nm)
1	air	X
2	Al	10:5:20
3	LiF	1.000000
4	B3PYMPM	50
5	CBP	20.000000
6	TAPC	20
7	cito	50
8	glass	X
9		
10		
11		
12	wavelength(nm) : 450:10:650.0	
13	EML :	
14	Layerno	: 5
15	Position(nm)	: 10.000000
16	ratio	: 1.000000
17	QY	: 1.000000
18	Fluorescence	: cbp_irppy2acac
19	DOF	: cbp_irppy2acac
20		

Thin metal

ueList-PDzCmd1.txt

Name	readfilename	readfilepath	savefilename	sav
#Ts1	sfile-1.txt	./Example/structure/Transparent	sfile-1	../../Example/PDzCmd-1/Trans

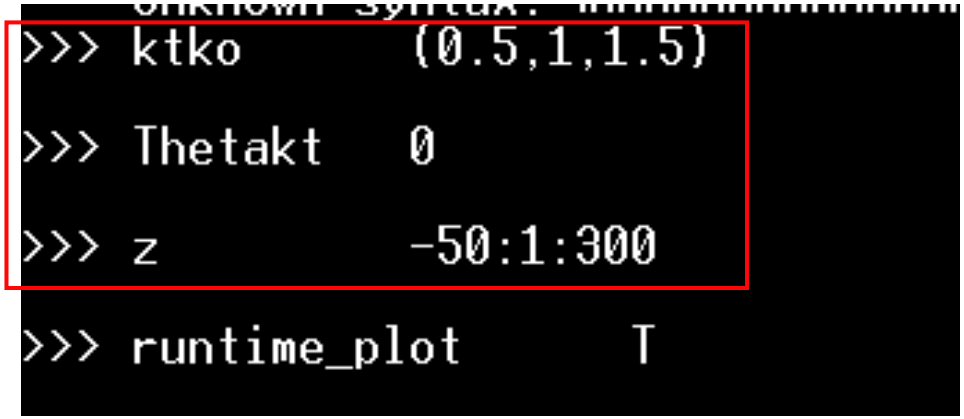
Calculate Power Density at z

```
>>> changefigshowBool F

>>> save_run_time_result_Bool F

>>> ReadStructListPath  ./Example/structure/Convention

>>> ReadStructListName  structureList-PDzCmd1.txt

>>> readStructList

Now reading structure list file ./Example/structure/Convention\structureList-PDzCmd1.txt
  No./Name       filename        savefilename  CommandID  Check                    readfilepath
-------------------------------------------------------------------------------------------------------------------------
       #s1    sfile-1.txt             sfile-1        0.0      X  ./Example/structure/Convention  ../../Example/PDzCmd-1/Conven


Structure file reading...
-----------------------------------------------------------------------------------------
Now reading structure file ./Example/structure/Convention\sfile-1.txt

>>> ReadStructListPath  ./Example/structure/Transparent

>>> ReadStructListName  structureList-PDzCmd1.txt

>>> readStructList

Now reading structure list file ./Example/structure/Transparent\structureList-PDzCmd1.txt
  No./Name       filename        savefilename  CommandID  Check                    readfilepath
-------------------------------------------------------------------------------------------------------------------------
      #Ts1    sfile-1.txt             sfile-1        0.0      X  ./Example/structure/Transparent  ../../Example/PDzCmd-1/Trans


Structure file reading...
-----------------------------------------------------------------------------------------
Now reading structure file ./Example/structure/Transparent\sfile-1.txt
```

Calculate Power Density at z

```
Structure file reading...
-----------------------------------------------------------------------------------------
Now reading structure file ./Example/structure/Transparent\sfile-1.txt


>>> printStructInfo

****************************************
Name: #s1
[#]   Material            Thickness(nm)
----------------------------------------
[1]   air                 X
[2]   Al                  120.0
[3]   LiF                 1.0
[4]   B3PYMPM             50.0
[5]   CBP                 20.0
[6]   TAPC                50.0
[7]   cito                80.0
[8]   glass               X

wavelength(nm) : 480.00000:10.00000:600.00000

EML   Fluorescence    DOF             Position(nm)    PLQY            Ratio
-----------------------------------------------------------------------------------------
[5]   cbp_irppy2acac  cbp_irppy2acac  10.0            1.0             1.0
Device number : 1


****************************************
Name: #Ts1
[#]   Material            Thickness(nm)
----------------------------------------
[1]   air                 X
[2]   Al                  10.00000:5.00000:20.00000
[3]   LiF                 1.0
[4]   B3PYMPM             50.0
[5]   CBP                 20.0
[6]   TAPC                20.0
[7]   cito                50.0
[8]   glass               X

wavelength(nm) : 450.00000:10.00000:650.00000

EML   Fluorescence    DOF             Position(nm)    PLQY            Ratio
-----------------------------------------------------------------------------------------
[5]   cbp_irppy2acac  cbp_irppy2acac  10.0            1.0             1.0
Device number : 3
```

Calculate Power Density at z



Calculate Power Density at z

```
>>> printPDInfo

Setting file path : ../../SETTING/user-1
Setting file name : PDCmd.setting
kt/ko : 0.50000:0.50000:1.50000
Theta in kt/ko domain : 0.0
kx/ko : 0.00000:0.01000:2.50000
ky/ko : 0.00000:0.01000:1.00000
z(nm) : -50.00000:1.00000:300.00000
Save Run Time Result  : False
Run Time Write Matrix : True
Run Time Plot         : True
Run Time Contour Plot : True

Plot Region Bool:
     EML                  : True (EMLz+ add EMLz- )
     EML(EMLz+)           : False (at the position just above emitting position)
     EML(EMLz-)           : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Plot Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : False
     -z    (M3+M4)        : False
     M1                   : False
     M2                   : False
     M3                   : False
     M4                   : False
Write Region Bool:
     EML                  : True (EMLz+ add EMLz- )
     EML(EMLz+)           : True (at the position just above emitting position)
     EML(EMLz-)           : True (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Write Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : True
     -z    (M3+M4)        : True
     M1                   : True
     M2                   : True
     M3                   : True
     M4                   : True
```

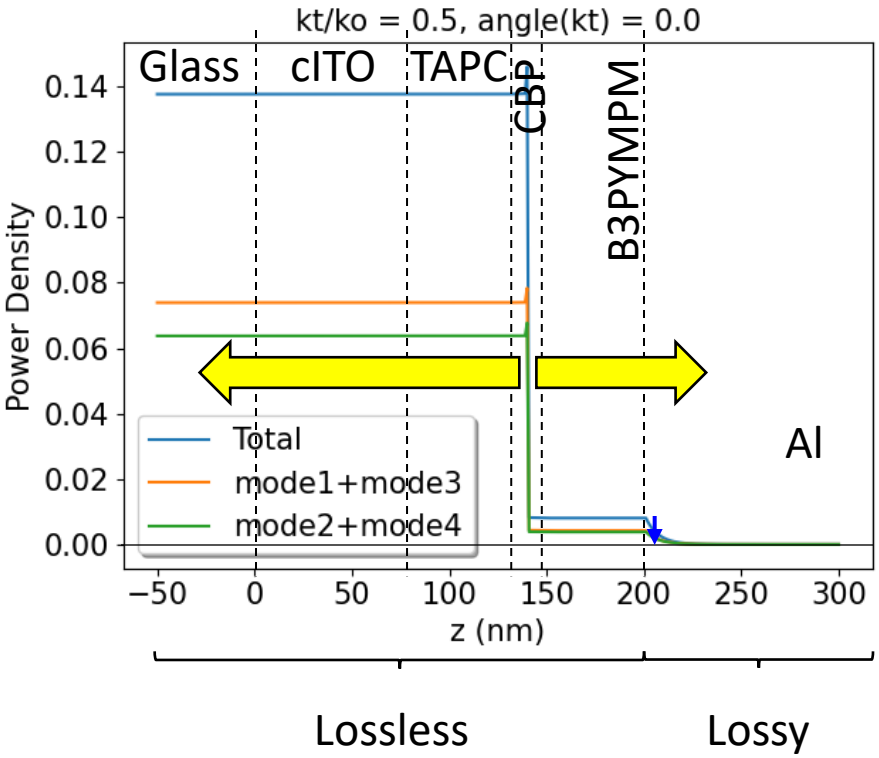
Calculate Power Density at z

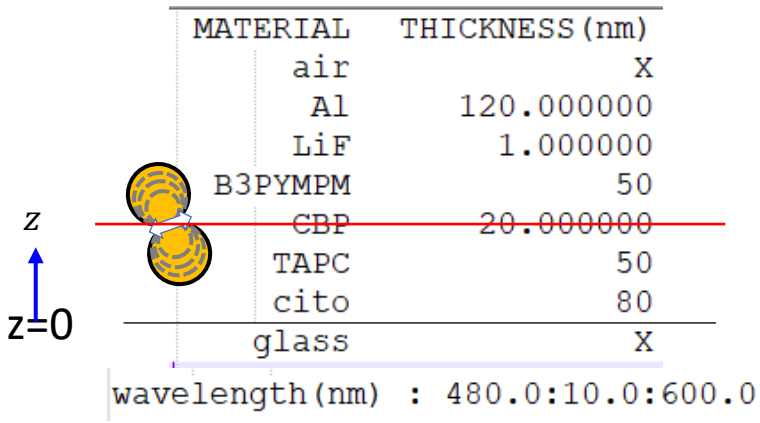
```
WriteMatrix Region Bool:
     EML                    : True (EMLz+ add EMLz- )
     EML(EMLz+)             : False (at the position just above emitting position)
     EML(EMLz-)             : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
WriteMatrix Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : False
     -z    (M3+M4)        : False
     M1                   : False
     M2                   : False
     M3                   : False
     M4                   : False
Figure Show Bool : False

>>> runPDz_PolarInK

Now running structure (#1/#2) #s1 ...
|Device-#13/#13|(100%)>>>>>>>>>>>>>>>>>>>>|Elapsed:0day(s)/0hr(s)/0min(s)/12sec(s)
Now running structure (#2/#2) #Ts1 ...
|Device-#63/#63|(100%)>>>>>>>>>>>>>>>>>>>>|Elapsed:0day(s)/0hr(s)/1min(s)/2sec(s)
>>> deleteStruct
```

Data at EML

Bottom-emitting OLED

480 nm

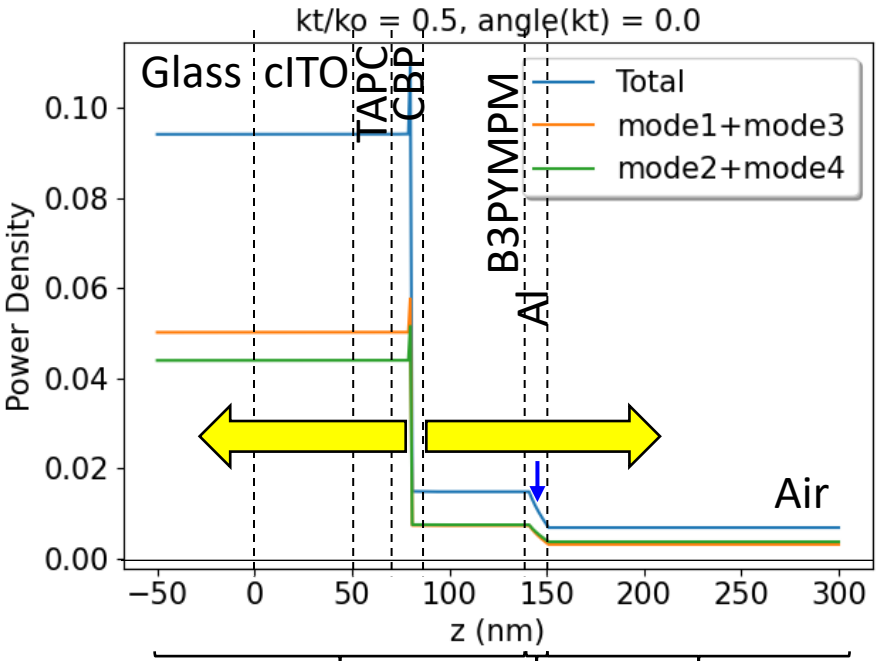




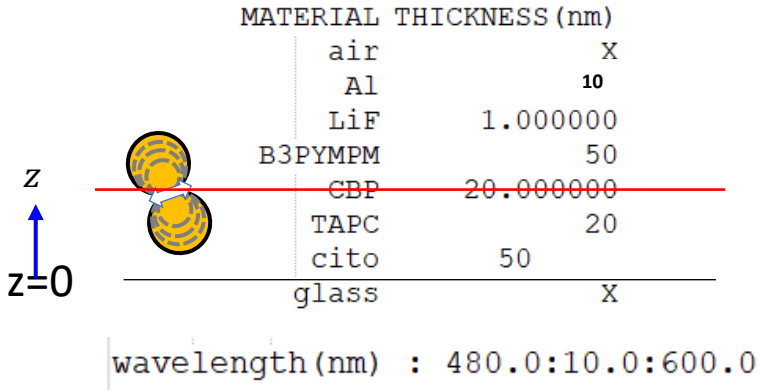
Data at EML

Transparent/ Double-emitting OLED

480 nm



Lossless Lossy Lossless



Calculate Incoherent Power Density at EML

```
>>> changefigshowBool F

>>> save_run_time_result_Bool F

>>> ReadStructListPath  ./Example/structure/Convention

>>> ReadStructListName  structureList-PDIncohCmd1.txt

>>> readStructList

Now reading structure list file ./Example/structure/Convention\structureList-PDIncohCmd1.txt
  No./Name         filename        savefilename  CommandID  Check                    readfilepath
-------------------------------------------------------------------------------------------------------------------------------
       #s1  sfile-1-air.txt             sfile-1        0.0      X  ./Example/structure/Convention  ../../Example/PDIncohCmd-1/Conventi


Structure file reading...
-------------------------------------------------------------------------------------------
Now reading structure file ./Example/structure/Convention\sfile-1-air.txt

>>> ReadStructListPath  ./Example/structure/Transparent

>>> ReadStructListName  structureList-PDIncohCmd1.txt

>>> readStructList

Now reading structure list file ./Example/structure/Transparent\structureList-PDIncohCmd1.txt
  No./Name         filename        savefilename  CommandID  Check                    readfilepath
-------------------------------------------------------------------------------------------------------------------------------
     #Tsa1  sfile-1-air.txt          sfile-1-air        0.0      X  ./Example/structure/Transparent  ../../Example/PDIncohCmd-1/Transpa


Structure file reading...
-------------------------------------------------------------------------------------------
Now reading structure file ./Example/structure/Transparent\sfile-1-air.txt
```

Calculate Incoherent Power Density at EML

sfile-1-air.txt

```
          MATERIAL                                THICKNESS(nm)
               air                                          X
                Al                                 120.000000
               LiF                                   1.000000
           B3PYMPM                                         50
               CBP                                 20.000000
              TAPC                                         50
              cito                                         80
             glass                                         X
               air                                         X


wavelength(nm) : 480.0:10.0:600.0
EML :
    Layerno                    : 5
    Position(nm)               : 10.000000
    ratio                      : 1.000000
    QY                         : 1.000000
    Fluorescence               : cbp_irppy2acac
    DOF                        : cbp_irppy2acac
```

Calculate Incoherent Power Density at EML

sfile-1-air.txt

	MATERIAL	THICKNESS(nm)
2	air	X
3	Al	10:5:20
4	LiF	1.000000
5	B3PYMPM	50
6	CBP	20.000000
7	TAPC	20
8	cito	50
9	glass	X
10	air	X
11		
12		

```
13 wavelength(nm) : 450:10:650.0
14 EML :
15     Layerno                  : 5
16     Position(nm)             : 10.000000
17     ratio                    : 1.000000
18     QY                       : 1.000000
19     Fluorescence             : cbp_irppy2acac
20     DOF                      : cbp_irppy2acac
```

Calculate Incoherent Power Density at EML

```
>>> printStructInfo

****************************************
Name: #s1
[#]   Material            Thickness(nm)
----------------------------------------
[1]   air                 X
[2]   Al                  120.0
[3]   LiF                 1.0
[4]   B3PYMPM             50.0
[5]   CBP                 20.0
[6]   TAPC                50.0
[7]   cito                80.0
[8]   glass               X
[9]   air                 X

wavelength(nm) : 480.00000:10.00000:600.00000

EML   Fluorescence    DOF             Position(nm)    PLQY            Ratio
--------------------------------------------------------------------------------
[5]   cbp_irppy2acac  cbp_irppy2acac  10.0            1.0             1.0
Device number : 1


****************************************
Name: #Tsa1
[#]   Material            Thickness(nm)
----------------------------------------
[1]   air                 X
[2]   Al                  10.00000:5.00000:20.00000
[3]   LiF                 1.0
[4]   B3PYMPM             50.0
[5]   CBP                 20.0
[6]   TAPC                20.0
[7]   cito                50.0
[8]   glass               X
[9]   air                 X

wavelength(nm) : 450.00000:10.00000:650.00000

EML   Fluorescence    DOF             Position(nm)    PLQY            Ratio
--------------------------------------------------------------------------------
[5]   cbp_irppy2acac  cbp_irppy2acac  10.0            1.0             1.0
Device number : 3
```

Calculate Incoherent Power Density at EML

```
*** Unknown syntax: ########################################
>>> ktko      0:0.001:2.5

>>> Thetakt   0

>>> runtime_write_matrix F

>>> runtime_plot         T

>>> runtime_contourplot  F

>>> printPDInfo

Setting file path : ../../SETTING/user-1
Setting file name : PDCmd.setting
kt/ko : 0.00000:0.00100:2.50000
Theta in kt/ko domain : 0.0
kx/ko : 0.00000:0.01000:2.50000
ky/ko : 0.00000:0.01000:1.00000
z(nm) : -50.00000:1.00000:300.00000
Save Run Time Result  : False
Run Time Write Matrix : False
Run Time Plot         : True
Run Time Contour Plot : False

Plot Region Bool:
     EML                    : True (EMLz+ add EMLz- )
     EML(EMLz+)             : False (at the position just above emitting position)
     EML(EMLz-)             : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Plot Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)    : True
     +z    (M1+M2)          : False
     -z    (M3+M4)          : False
     M1                     : False
     M2                     : False
     M3                     : False
     M4                     : False
Write Region Bool:
     EML                    : True (EMLz+ add EMLz- )
     EML(EMLz+)             : True (at the position just above emitting position)
     EML(EMLz-)             : True (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Write Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)    : True
     +z    (M1+M2)          : True
     -z    (M3+M4)          : True
     M1                     : True
     M2                     : True
```

Calculate Incoherent Power Density at EML

```
Write Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : True
     -z    (M3+M4)        : True
     M1                   : True
     M2                   : True
     M3                   : True
     M4                   : True
WriteMatrix Region Bool:
     EML                  : True (EMLz+ add EMLz- )
     EML(EMLz+)           : False (at the position just above emitting position)
     EML(EMLz-)           : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
WriteMatrix Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : False
     -z    (M3+M4)        : False
     M1                   : False
     M2                   : False
     M3                   : False
     M4                   : False
Figure Show Bool : False
```

```
>>> runInCoPD_PolarInK

Now running structure (#1/#2) #s1 ...
|Device-#13/#13|(100%)>>>>>>>>>>>>>>>>>>>>|Elapsed:0day(s)/0hr(s)/0min(s)/45sec(s)
Now running structure (#2/#2) #Tsa1 ...
|Device-#63/#63|(100%)>>>>>>>>>>>>>>>>>>>>|Elapsed:0day(s)/0hr(s)/3min(s)/37sec(s)
```

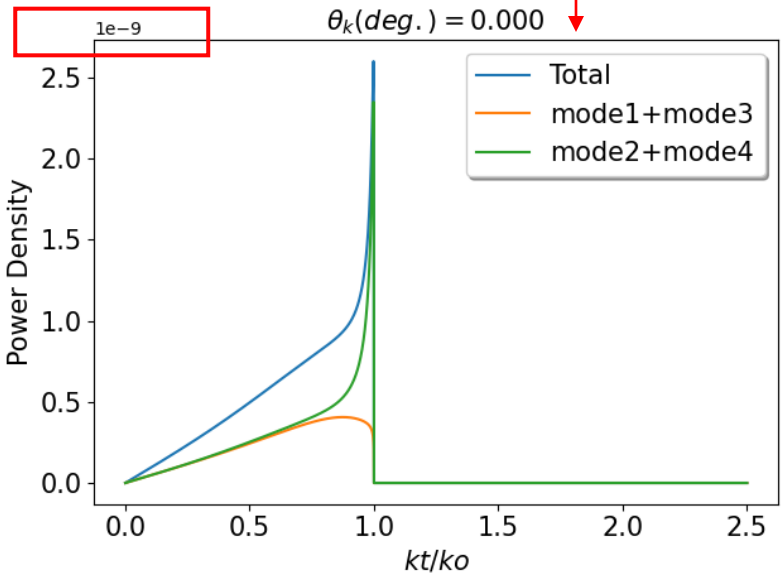
Data at EML

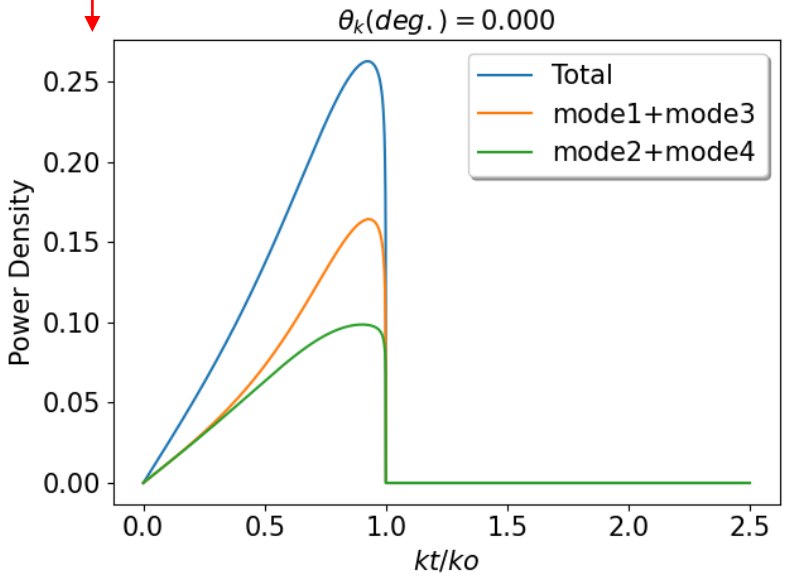
Bottom-emitting OLED

480 nm

MATERIAL	THICKNESS(nm)
air	X
Al	120.000000
LiF	1.000000
B3PYMPM	50
CBP	20.000000
TAPC	50
cito	80
glass	X
air	X

wavelength(nm) : 480.0:10.0:600.0





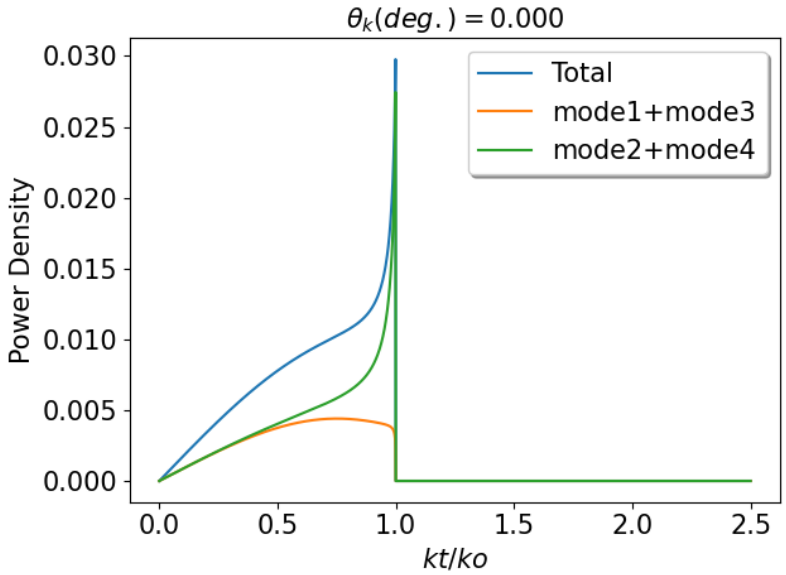
Data at EML

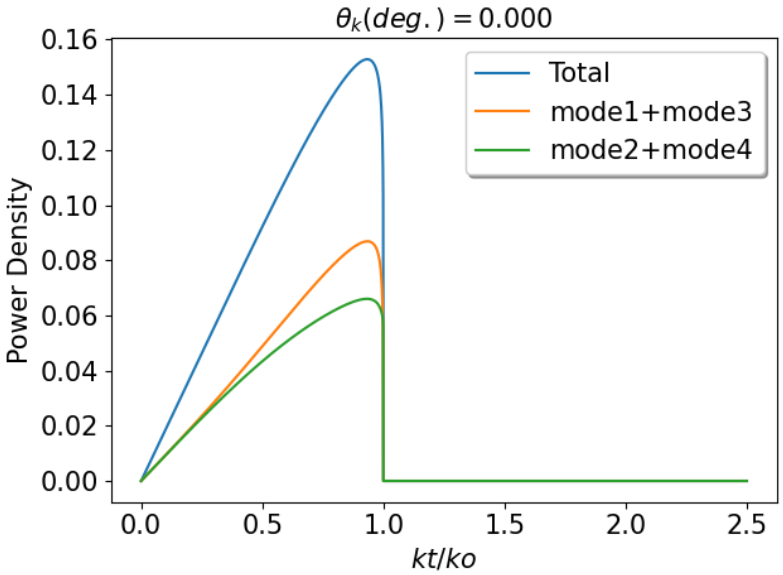
Transparent/ Double-emitting OLED

480 nm

MATERIAL	THICKNESS(nm)
air	X
Al	10:5:20
LiF	1.000000
B3PYMPM	50
CBP	20.000000
TAPC	20
cito	50
glass	X
air	X

wavelength(nm) : 480.0:10.0:600.0





Calculate Incoherent Power Density at EML

```
>>> kxko      0:0.01:2.5

>>> kyko      0:0.01:1

>>> runtime_write_matrix T

>>> runtime_plot         F

>>> runtime_contourplot  T

>>> printPDInfo

Setting file path : ../../SETTING/user-1
Setting file name : PDCmd.setting
kt/ko : 0.00000:0.00100:2.50000
Theta in kt/ko domain : 0.0
kx/ko : 0.00000:0.01000:2.50000
ky/ko : 0.00000:0.01000:1.00000
z(nm) : -50.00000:1.00000:300.00000
Save Run Time Result  : False
Run Time Write Matrix : True
Run Time Plot         : False
Run Time Contour Plot : True

Plot Region Bool:
     EML                    : True (EMLz+ add EMLz- )
     EML(EMLz+)             : False (at the position just above emitting position)
     EML(EMLz-)             : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Plot Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)  : True
     +z    (M1+M2)        : False
     -z    (M3+M4)        : False
     M1                   : False
     M2                   : False
     M3                   : False
     M4                   : False
```

Calculate Incoherent Power Density at EML

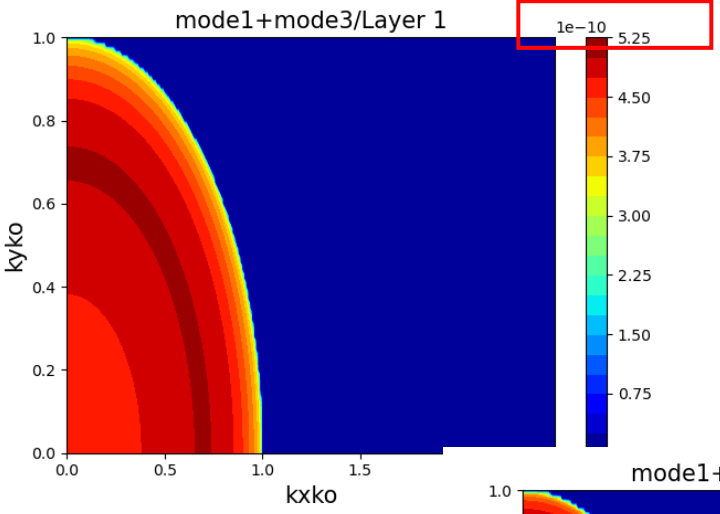
```
     M4                    : False
Write Region Bool:
     EML                   : True (EMLz+ add EMLz- )
     EML(EMLz+)            : True (at the position just above emitting position)
     EML(EMLz-)            : True (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
Write Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)   : True
     +z    (M1+M2)         : True
     -z    (M3+M4)         : True
     M1                    : True
     M2                    : True
     M3                    : True
     M4                    : True
WriteMatrix Region Bool:
     EML                   : True (EMLz+ add EMLz- )
     EML(EMLz+)            : False (at the position just above emitting position)
     EML(EMLz-)            : False (at the position just below emitting position)
     +Semi-infinite region: True (at the interface of the 1st semi-infinite region)
     -Semi-infinite region: True (at the interface of the last semi-infinite region)
WriteMatrix Mode Bool: (should be cosidered with plot region bool)
     Total (M1+M2+M3+M4)   : True
     +z    (M1+M2)         : False
     -z    (M3+M4)         : False
     M1                    : False
     M2                    : False
     M3                    : False
     M4                    : False
Figure Show Bool : False

>>> runInCoPD_kxky

Now running structure (#1/#2) #s1 ...
|Device-#13/#13|(100%)>>>>>>>>>>>>>>>>>>>>|Elapsed:0day(s)/0hr(s)/6min(s)/43sec(s)
Now running structure (#2/#2) #Tsa1 ...
|Device-#63/#63|(100%)>>>>>>>>>>>>>>>>>>>>|Elapsed:0day(s)/0hr(s)/32min(s)/9sec(s)
```

Data at EML

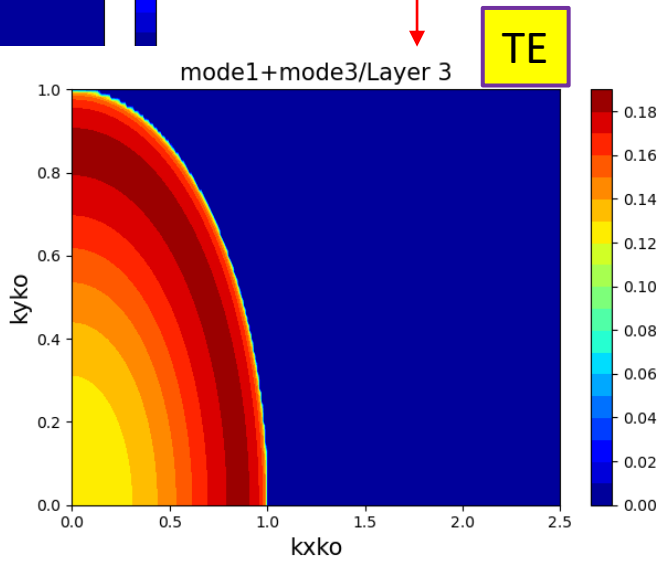
Bottom-emitting OLED

480 nm

TE



TE



MATERIAL	THICKNESS(nm)
air	X
Al	120.000000
LiF	1.000000
B3PYMPM	50
CBP	20.000000
TAPC	50
cito	80
glass	X
air	X

wavelength(nm) : 480.0:10.0:600.0

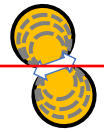
Data at EML

Transparent/ Double-emitting OLED

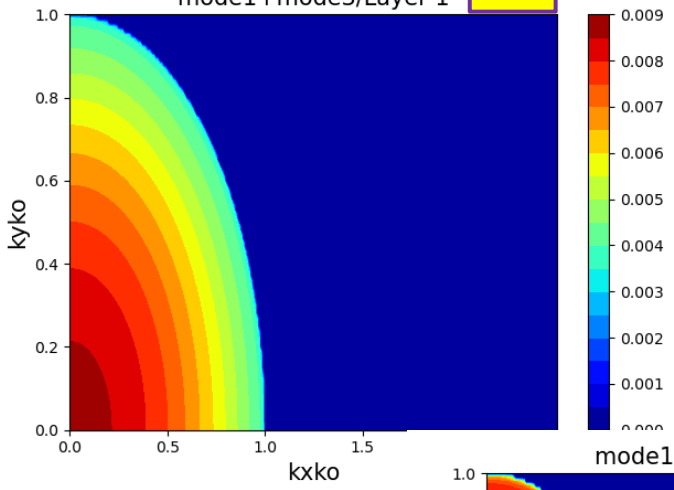
480 nm

MATERIAL	THICKNESS(nm)
air	X
Al	10:5:20
LiF	1.000000
B3PYMPM	50
CBP	20.000000
TAPC	20
cito	50
glass	X
air	X

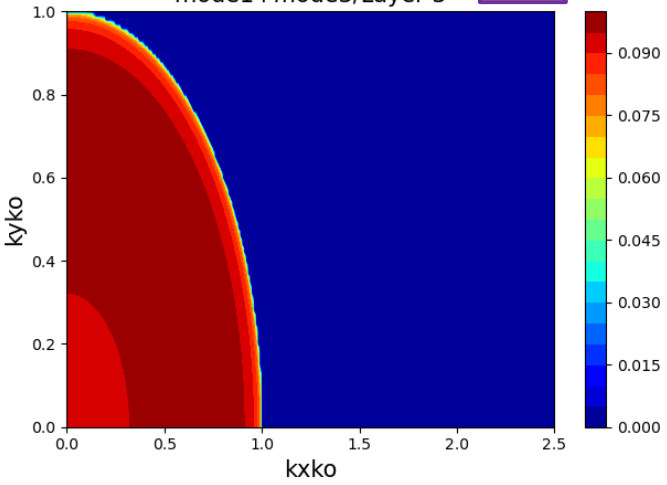
wavelength(nm) : 480.0:10.0:600.0



TE



TE



Calculate Device Distribution

Exit the material manager system.
*** The material manager system would be automatically saved into the user's setting directory.