
Overlay Analysis

F. Cerrina
8/23/1998

Initialization

```
ClearAll@D
```

First input the packages needed for the study:

```
Needs@"Statistics`DataManipulation`"D  
Needs@"Graphics`Graphics`"D  
Needs@"Graphics`PlotField`"D  
Needs@"Statistics`MultiDescriptiveStatistics`"D
```

As usual, we use the following command to define the current working directory:

```
workdir = "f:•sumitomo•tracing•overview•overlay•"  
SetDirectory@workdirD
```

```
f:•sumitomo•tracing•overview•overlay•
```

```
f:\sumitomo\tracing\overview\overlay
```

Data input and preparation

First we read in the data and create 4 arrays for the variables {x,x',z,z'}

```
Clear@xdata, zdata, x, z, xprime, zprimeD
infile = workdir <> "xx1.dat";
OpenRead@infileD;
xdata = ReadList@infile, Number, RecordLists -> TrueD;
Close@infileD;
infile = workdir <> "zz1.dat";
OpenRead@infileD;
zdata = ReadList@infile, Number, RecordLists -> TrueD;
Close@infileD;

np = Length@xdataD
x = Table@xdata@@i, 1DD, 8i, 1, np<D;
x1 = Table@xdata@@i, 2DD, 8i, 1, np<D;
z = Table@zdata@@i, 1DD, 8i, 1, np<D;
z1 = Table@zdata@@i, 2DD, 8i, 1, np<D;
```

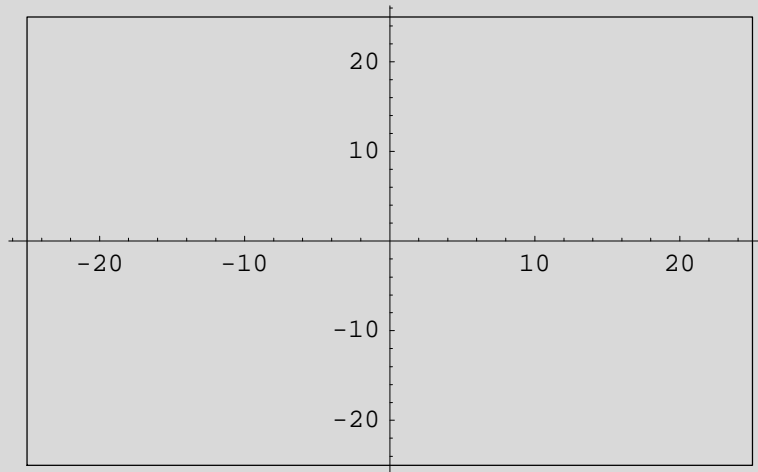
153

Data Display

Plot separately the real image and the angle distribution. First the image:

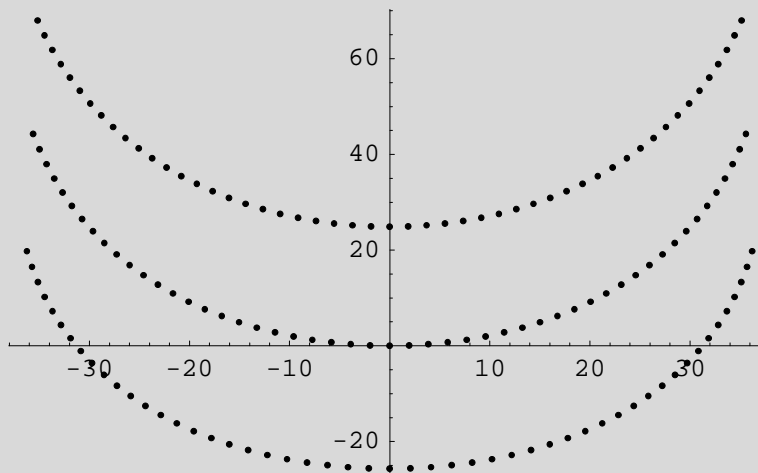
```
field = 88-25, -25<, 8-25, 25<, 825, 25<, 825, -25<, 8-25, -25<<;  
fieldplot = ListPlot@field, PlotJoined -> TrueD;
```

```
88-25, -25<, 8-25, 25<, 825, 25<, 825, -25<, 8-25, -25<<
```

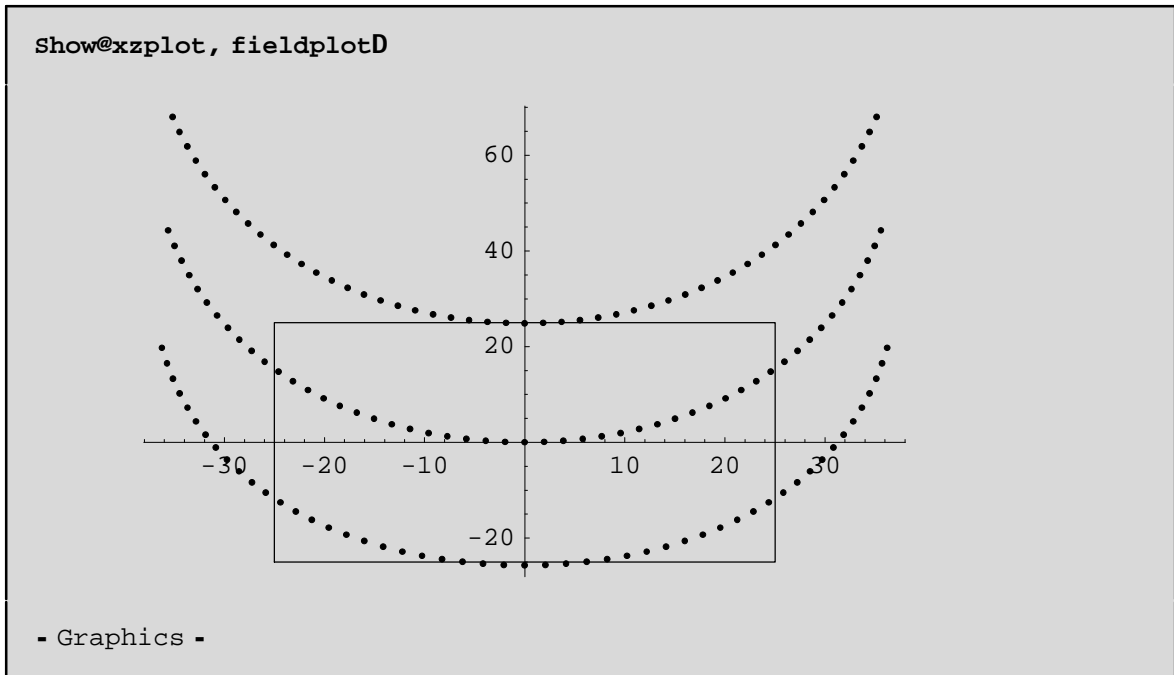


- Graphics -

```
xz = Table@8x@@iDD, z@@iDD<, 8i, np<D;  
xzplot = ListPlot@xzD;
```

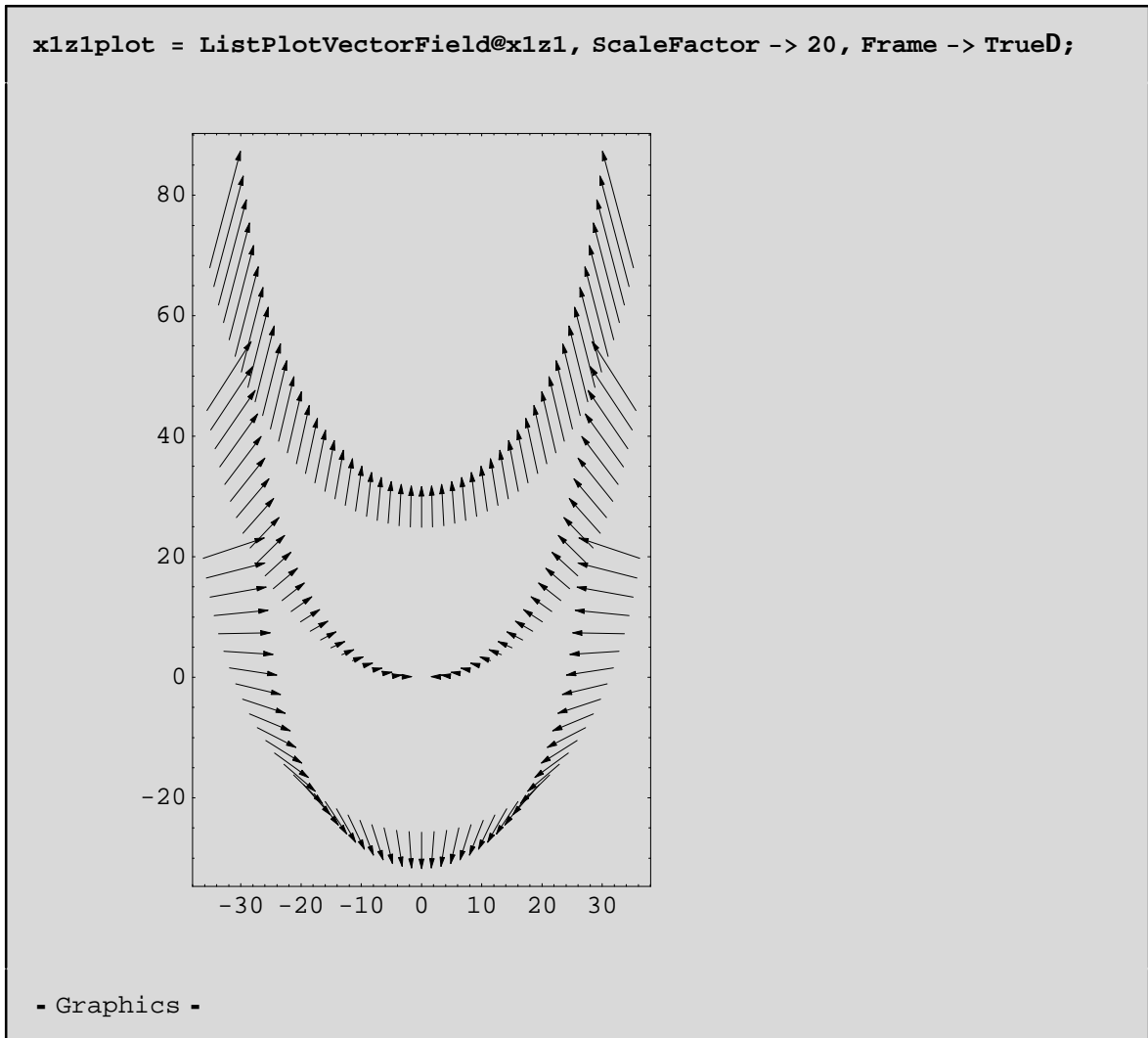


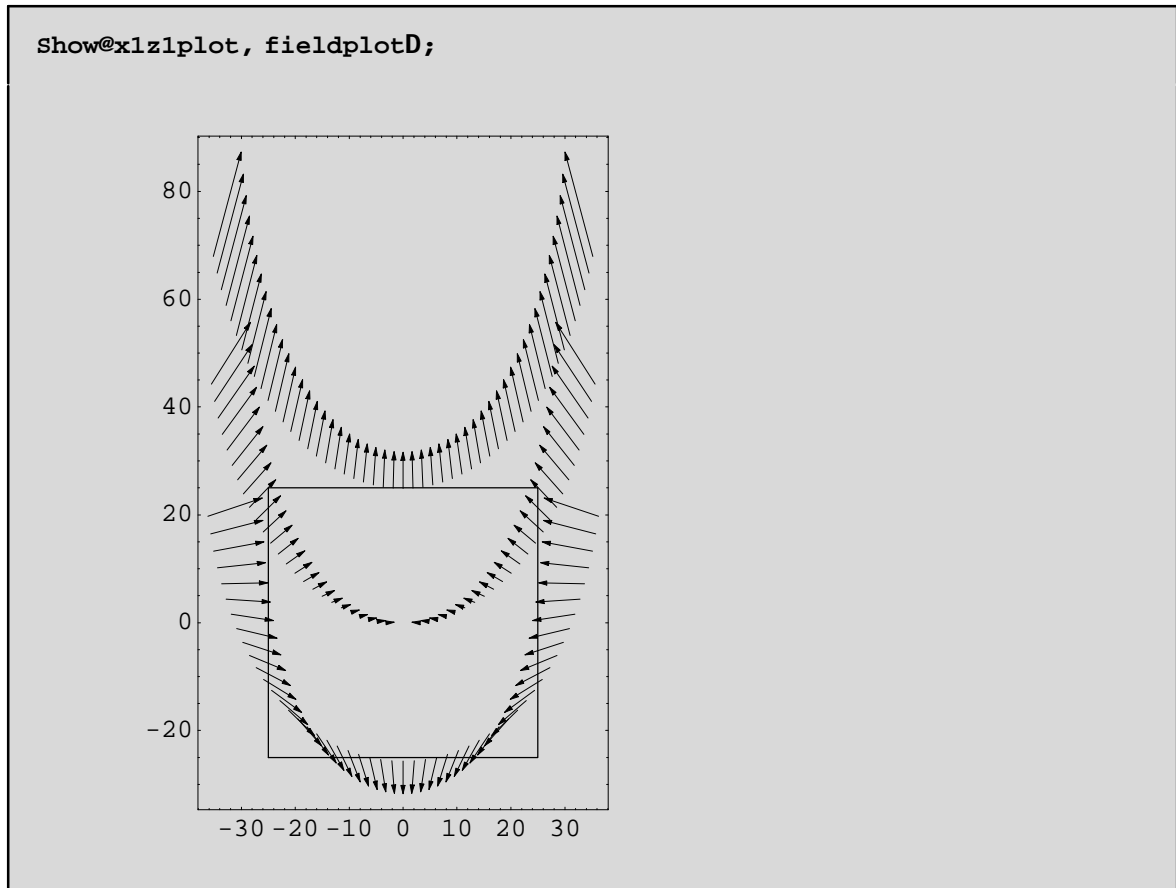
- Graphics -



Then the angles:

```
x1z1 = Table@88x@@iDD, z@@iDD<, 8x1@@iDD, z1@@iDD<<, 8i, np<D;
```

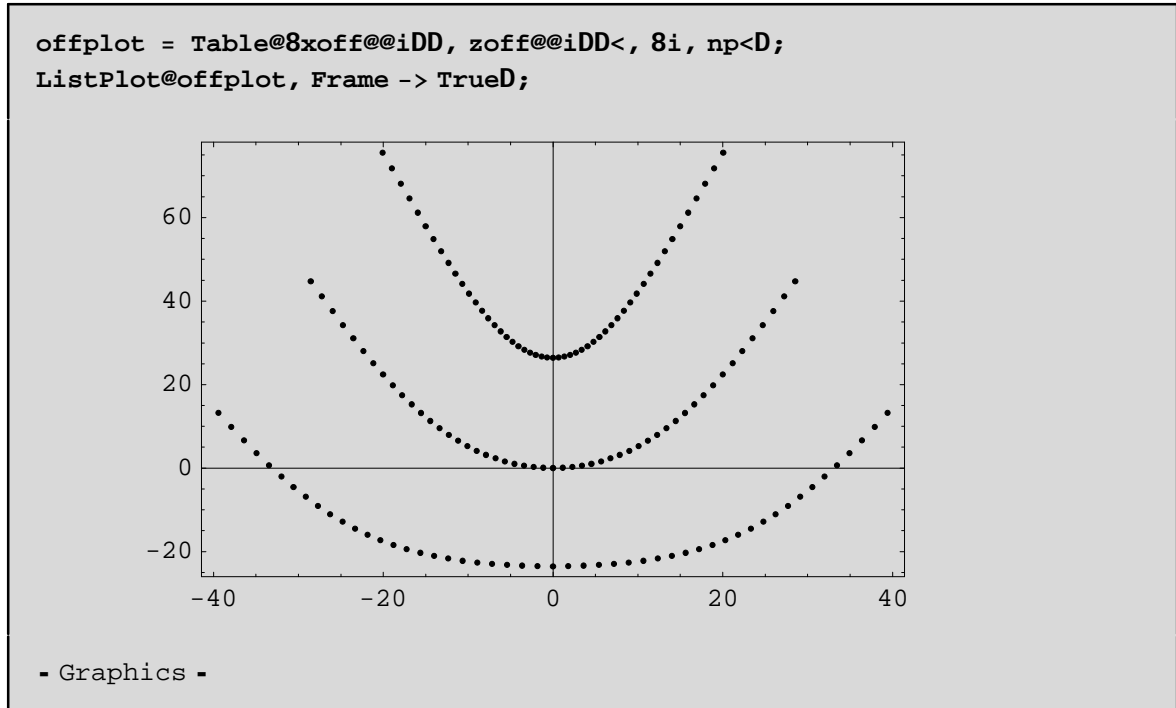




Compute now the overlay error for various gaps (units will be in nanometers):

```
gap = 10000 H* nanometers *L  
xoff = x1 * gap;  
zoff = z1 * gap;
```

```
10000
```



Discussion

This is a preliminary study of the overlay error induced by the optics. In order to obtain a better analysis we need a finer mesh (i.e., more SHADOW runs).