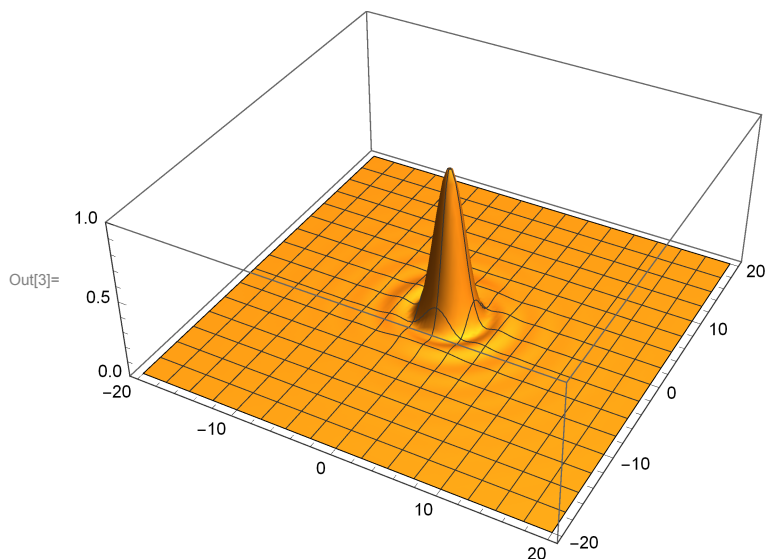
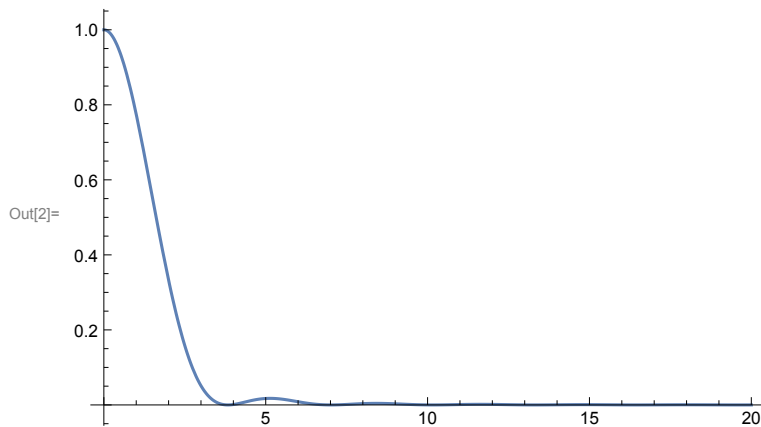
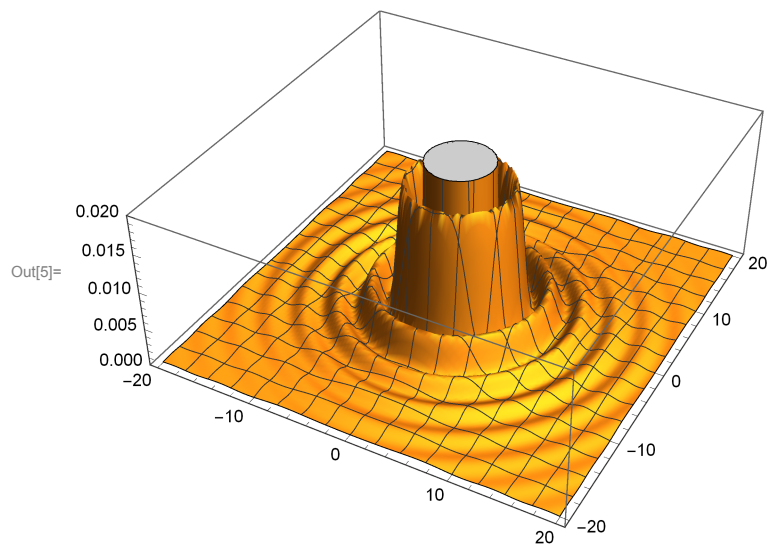
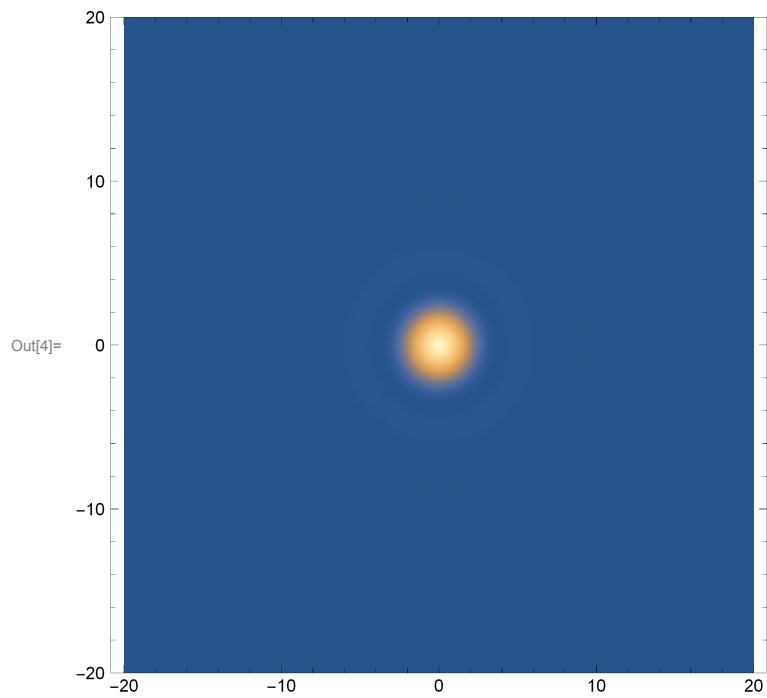
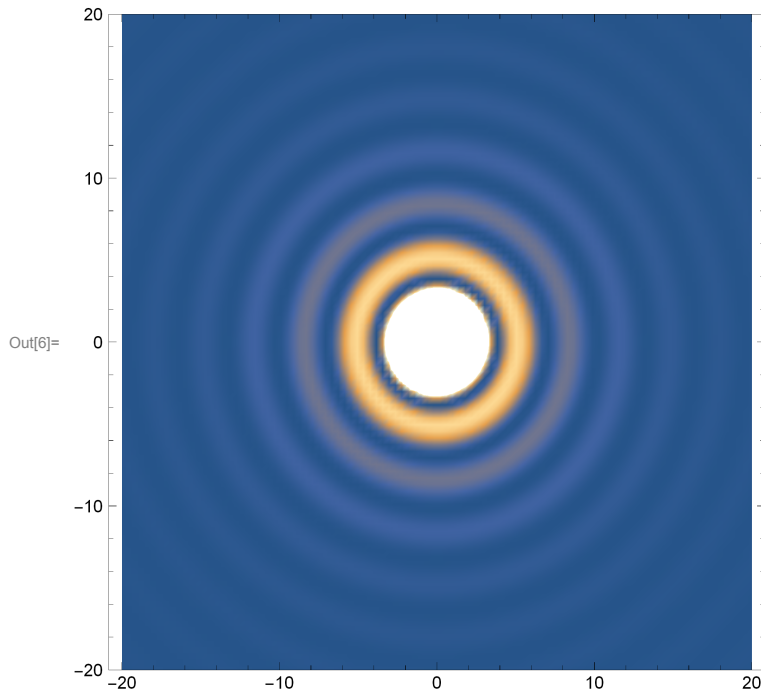


```
In[1]:= jinc[x_] := 2 BesselJ[1, x] / x
```

```
(* Diffraction through a circular aperture, radius a *)  
(* This is the "Airy pattern",  
which is the central "Airy disk" plus the "Airy rings" *)  
(* With a, k, and z all set equal to 1 for simplicity *)  
(* Plot of (FT of "top hat")^2 *)  
Plot[jinc[kr]^2, {kr, 0, 20}, PlotRange -> All]  
Plot3D[jinc[Sqrt[x^2 + y^2]]^2, {x, -20, 20},  
  {y, -20, 20}, PlotRange -> {0, 1}, PlotPoints -> 100]  
DensityPlot[jinc[Sqrt[x^2 + y^2]]^2, {x, -20, 20},  
  {y, -20, 20}, PlotRange -> {0, 1}, PlotPoints -> 100]  
(* now zooming in a bit *)  
Plot3D[jinc[Sqrt[x^2 + y^2]]^2, {x, -20, 20},  
  {y, -20, 20}, PlotRange -> {0, 0.02}, PlotPoints -> 100]  
DensityPlot[jinc[Sqrt[x^2 + y^2]]^2, {x, -20, 20},  
  {y, -20, 20}, PlotRange -> {0, 0.02}, PlotPoints -> 100]
```







```
In[7]:= (* A square side length a centered at (2a,0)
combined with a circle radius a centered at (-2a,0) *)
(* With a, k, and z all set equal to 1 for simplicity *)
(* Notice how the result incorporates features of a square,
a circle, and a double slit. *)
sum[x_, y_] :=
  Exp[I 2 x] (1 / (2 Pi)) Sinc[x/2] Sinc[y/2] + Exp[-I 2 x] (1/2) jinc[Sqrt[x^2 + y^2]]
Plot3D[Abs[sum[x, y]]^2, {x, -20, 20}, {y, -20, 20},
  PlotRange -> {0, 0.4345}, PlotPoints -> 200]
DensityPlot[Abs[sum[x, y]]^2, {x, -20, 20}, {y, -20, 20},
  PlotRange -> {0, 0.4345}, PlotPoints -> 200]
(* now zooming in a bit *)
Plot3D[Abs[sum[x, y]]^2, {x, -20, 20},
  {y, -20, 20}, PlotRange -> {0, 0.01}, PlotPoints -> 200]
DensityPlot[Abs[sum[x, y]]^2, {x, -20, 20}, {y, -20, 20},
  PlotRange -> {0, 0.01}, PlotPoints -> 200]
```

