

```
In[305]:= ClearAll["Global`*"]
```

Path function for export

```
In[306]:= mypath[image_name_] :=  
    StringTemplate["` ```.pdf"][NotebookDirectory[], image_name];
```

Function for setting up the ticks length

Source:

<https://mathematica.stackexchange.com/questions/206173/increasing-the-length-of-frame-ticks>

```
In[307]:= (*Needs["GeneralUtilities`"];  
PrintDefinitions[Charting`ScaledTicks];  
tickFunc=  
Charting`ScaledTicks[{Identity,Identity},TicksLength->{.05,.02}][##]&;*)
```

Spin components

```
In[308]:= j1 = 13/2 * Sin[Pi/4] * Cos[Pi/4];  
j2 = 13/2 * Sin[Pi/4] * Sin[Pi/4];  
j3 = 13/2 * Cos[Pi/4];  
SpinValue = 35/2; (* --> I [ħ] <--- *)  
Print["j1=", N[j1], "\n", "j2=",  
    N[j2], "\n", "j3=", N[j3], "\n", "I=", SpinValue]  
  
j1=3.25  
j2=3.25  
j3=4.59619  
I= $\frac{35}{2}$ 
```

Energy function

```
In[313]:= Energy[th_, phi_] :=  $\frac{1}{120}$  (SpinValue * Sin[th] Cos[phi] - j1)2 +  
     $\frac{1}{40}$  (SpinValue * Sin[th] Sin[phi] - j2)2 +  $\frac{1}{60}$  (SpinValue * Cos[th] - j3)2;
```

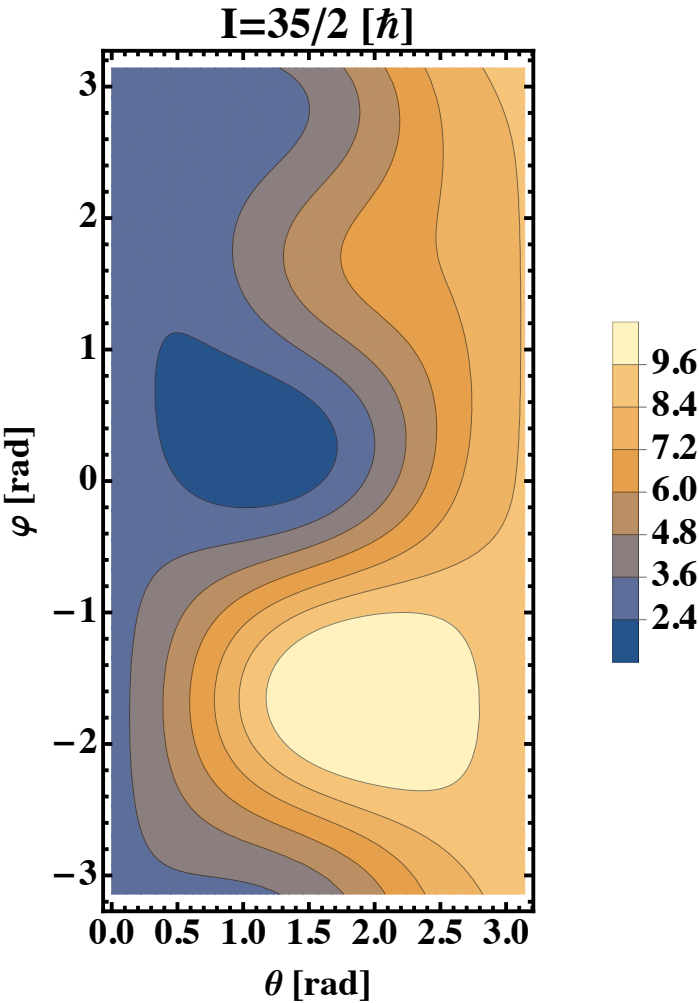
Contour-Plots (part-1)

```
In[314]:= contourSetA1 = ContourPlot[Energy[th, phi], {th, 0, Pi}, {phi, -Pi, Pi},
  AspectRatio → Automatic, ImageSize → {320, 520}, Frame → True,
  (*FrameTicks→{{tickFunc,tickFunc},{tickFunc,tickFunc}},*)
  FrameStyle → Directive[Black, Thick], FrameLabel → {"θ [rad]", "φ [rad]"},
  PlotLegends → Automatic, LabelStyle → {19, Bold, Black, FontFamily → "Times"},
  Contours → 7, PlotLabel → StringTemplate["I=ℏ2/2 [ħ]"][SpinValue*2]];
contourSetA2 = ContourPlot[Energy[th, phi], {phi, -Pi, Pi}, {th, 0, Pi},
  AspectRatio → Automatic, ImageSize → {520, 320}, Frame → True,
  (*FrameTicks→{{tickFunc,tickFunc},{tickFunc,tickFunc}},*)
  FrameStyle → Directive[Black, Thick], FrameLabel → {"φ [rad]", "θ [rad]"},
  PlotLegends → Automatic, LabelStyle → {19, Bold, Black, FontFamily → "Times"},
  Contours → 7, PlotLabel → StringTemplate["I=ℏ2/2 [ħ]"][SpinValue*2]];
```

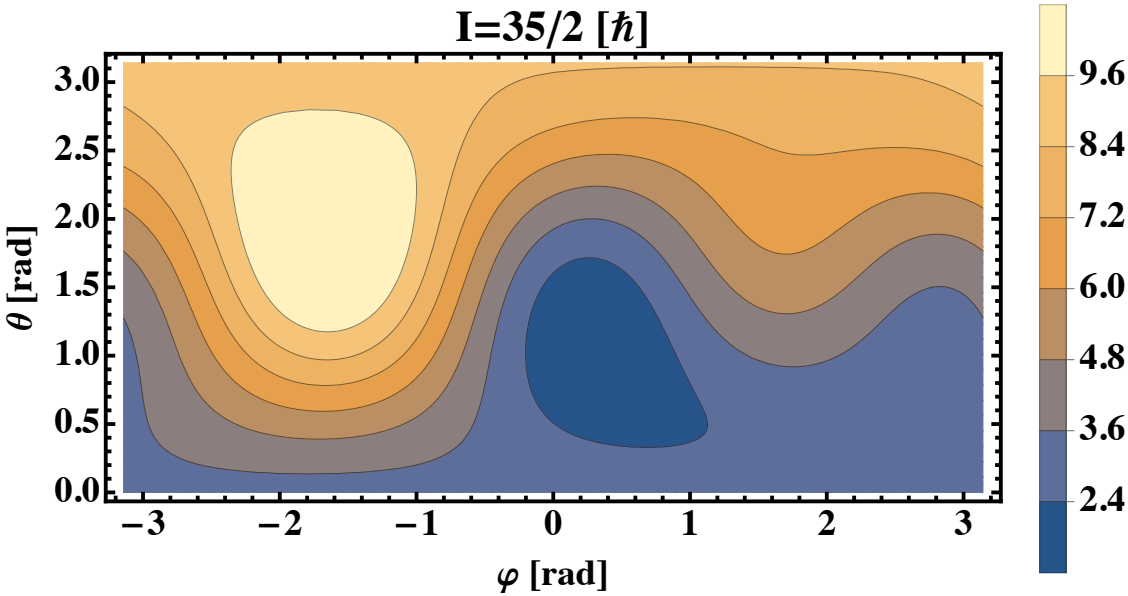
Export figures (part-1)

```
In[316]:= Export[mypath["contourSetA1"], Show[contourSetA1]];
Show[contourSetA1]
Export[mypath["contourSetA2"], Show[contourSetA2]];
Show[contourSetA2]
```

Out[317]=



Out[319]=

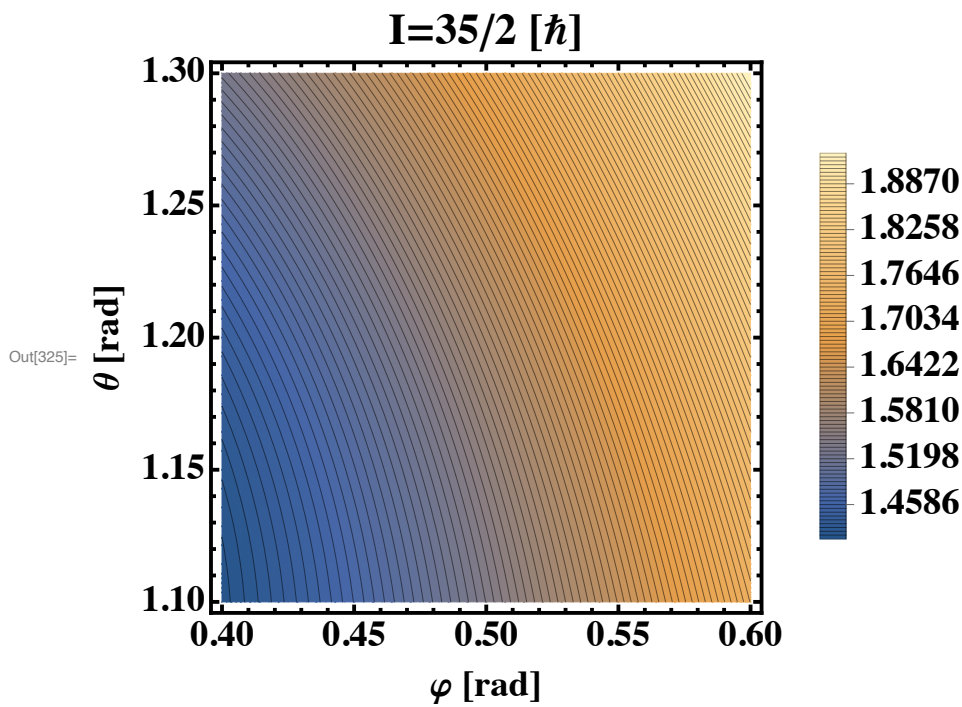
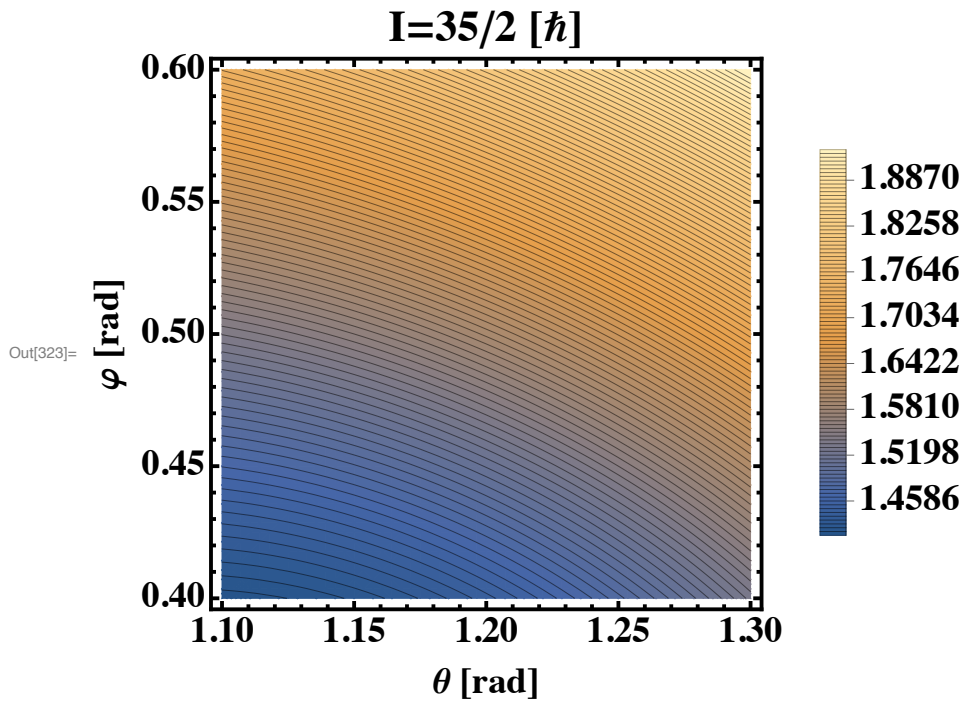


Contour-Plots (part-2)

```
In[320]:= contourSetB1 = ContourPlot[Energy[th, phi], {th, 1.1, 1.3}, {phi, 0.4, 0.6},
  Contours → 100, AspectRatio → Automatic, ImageSize → Medium, Frame → True,
  (*FrameTicks→{{tickFunc,tickFunc},{tickFunc,tickFunc}},*)
  FrameStyle → Directive[Black, Thick], FrameLabel → {"θ [rad]", "φ [rad]"},
  PlotLegends → Automatic, LabelStyle → {19, Bold, Black, FontFamily → "Times"},
  PlotLabel → StringTemplate["I=ℏ2/2 [ħ]"][SpinValue*2]];
contourSetB2 = ContourPlot[Energy[th, phi], {phi, 0.4, 0.6}, {th, 1.1, 1.3},
  Contours → 100, AspectRatio → Automatic, ImageSize → Medium, Frame → True,
  (*FrameTicks→{{tickFunc,tickFunc},{tickFunc,tickFunc}},*)
  FrameStyle → Directive[Black, Thick], FrameLabel → {"φ [rad]", "θ [rad]"},
  PlotLegends → Automatic, LabelStyle → {19, Bold, Black, FontFamily → "Times"},
  Contours → 7, PlotLabel → StringTemplate["I=ℏ2/2 [ħ]"][SpinValue*2]];
```

Export figures (part-2)

```
In[322]:= Export[mypath["contourSetB1"], Show[contourSetB1]];
Show[contourSetB1]
Export[mypath["contourSetB2"], Show[contourSetB2]];
Show[contourSetB2]
```



Numerical test

```
In[326]:= th = 1.21; phi = 0.53;  
II1 = SpinValue * Sin[th] Cos[phi];  
II2 = SpinValue * Sin[th] Sin[phi];  
II3 = SpinValue * Cos[th];  
Print["I1=", II1, "\n", "I2=", II2, "\n", "I3=", II3]  
  
I1=14.127  
I2=8.27724  
I3=6.17784
```