

Baryonspektroskopie – $pp \rightarrow p\pi^0p$
Partialwellenanalyse
Statusreport 8

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Gruppenmeeting
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Zahl der Amplituden

Naiv:

- ▶ 2 Reflektivitäten ($\epsilon = \pm i$)
- ▶ 2 Helizitäten ($\lambda = \pm \frac{1}{2}$)
- ▶ 2 Paritäten ($\eta = \pm$)
- ▶ 2 Spins pro Drehimpuls ($\mathbf{J} = \mathbf{L} \pm \frac{1}{2}$) außer $\mathbf{L} = 0$

16 komplexe Amplituden pro Drehimpuls (8 für $\mathbf{L} = 0$)

Einschränkungen:

- ▶ Clebsch-Gordon-Koeffizienten verlangen $\lambda = M$, in Reflektivitätsbasis nur $M = +\frac{1}{2} \rightarrow$ Nur $\lambda = +\frac{1}{2}$
 - ▶ Für Baryonen gilt $\eta = (-1)^L \rightarrow$ Kopplung von \mathbf{L} und η
- \Rightarrow Nur 2 Amplituden ($\epsilon = \pm i$) für gegebenes \mathbf{J}^n (bzw. 4 Amplituden für gegebenes \mathbf{L})



Verbleibende Amplituden

$$\frac{1}{2}^+ : \quad \mathbf{T}_{\frac{1}{2}^+}^\epsilon \cdot \frac{1}{\sqrt{2}} \cdot (\mathbf{D}_{\frac{1}{2}^+}^{\frac{1}{2} \frac{1}{2}}(\phi, \theta, 0) - \epsilon \mathbf{D}_{-\frac{1}{2}^+}^{\frac{1}{2} \frac{1}{2}}(\phi, \theta, 0)) \cdot \mathbf{F}_0(\mathbf{q})$$

$$\frac{1}{2}^- : \quad -\mathbf{T}_{\frac{1}{2}^-}^\epsilon \cdot \frac{1}{\sqrt{2}} \cdot (\mathbf{D}_{\frac{1}{2}^-}^{\frac{1}{2} \frac{1}{2}}(\phi, \theta, 0) + \epsilon \mathbf{D}_{-\frac{1}{2}^-}^{\frac{1}{2} \frac{1}{2}}(\phi, \theta, 0)) \cdot \mathbf{F}_1(\mathbf{q})$$

$$\frac{3}{2}^+ : \quad -\mathbf{T}_{\frac{3}{2}^+}^\epsilon \cdot 1 \cdot (\mathbf{D}_{\frac{3}{2}^+}^{\frac{3}{2} \frac{1}{2}}(\phi, \theta, 0) + \epsilon \mathbf{D}_{-\frac{3}{2}^+}^{\frac{3}{2} \frac{1}{2}}(\phi, \theta, 0)) \cdot \mathbf{F}_2(\mathbf{q})$$

$$\frac{3}{2}^- : \quad \mathbf{T}_{\frac{3}{2}^-}^\epsilon \cdot 1 \cdot (\mathbf{D}_{\frac{3}{2}^-}^{\frac{3}{2} \frac{1}{2}}(\phi, \theta, 0) - \epsilon \mathbf{D}_{-\frac{3}{2}^-}^{\frac{3}{2} \frac{1}{2}}(\phi, \theta, 0)) \cdot \mathbf{F}_1(\mathbf{q})$$

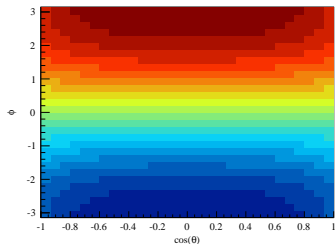
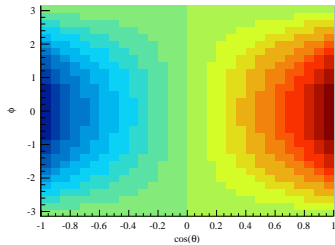
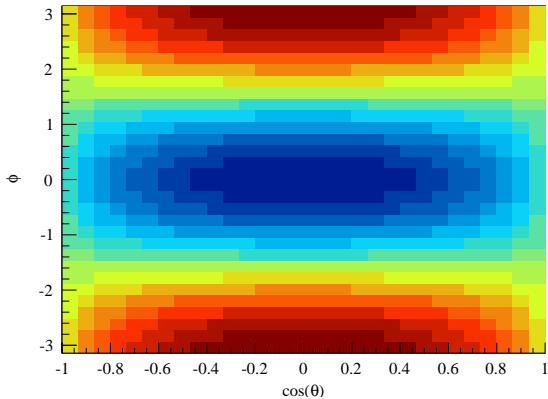
$$\frac{5}{2}^+ : \quad \mathbf{T}_{\frac{5}{2}^+}^\epsilon \cdot \sqrt{\frac{3}{2}} \cdot (\mathbf{D}_{\frac{5}{2}^+}^{\frac{5}{2} \frac{1}{2}}(\phi, \theta, 0) - \epsilon \mathbf{D}_{-\frac{5}{2}^+}^{\frac{5}{2} \frac{1}{2}}(\phi, \theta, 0)) \cdot \mathbf{F}_2(\mathbf{q})$$

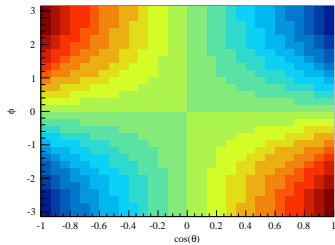
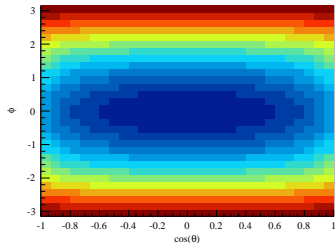
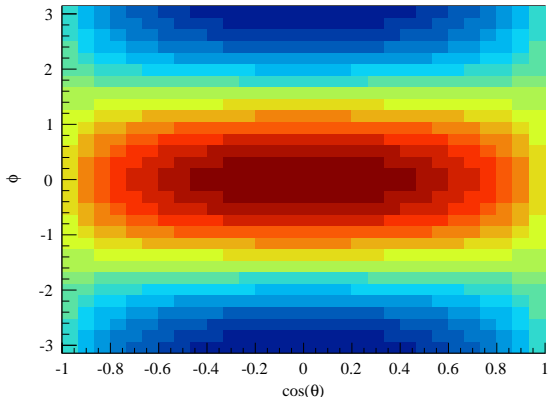
$$\frac{5}{2}^- : \quad -\mathbf{T}_{\frac{5}{2}^-}^\epsilon \cdot \sqrt{\frac{3}{2}} \cdot (\mathbf{D}_{\frac{5}{2}^-}^{\frac{5}{2} \frac{1}{2}}(\phi, \theta, 0) + \epsilon \mathbf{D}_{-\frac{5}{2}^-}^{\frac{5}{2} \frac{1}{2}}(\phi, \theta, 0)) \cdot \mathbf{F}_3(\mathbf{q})$$

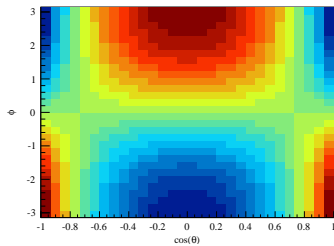
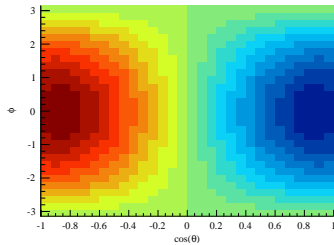
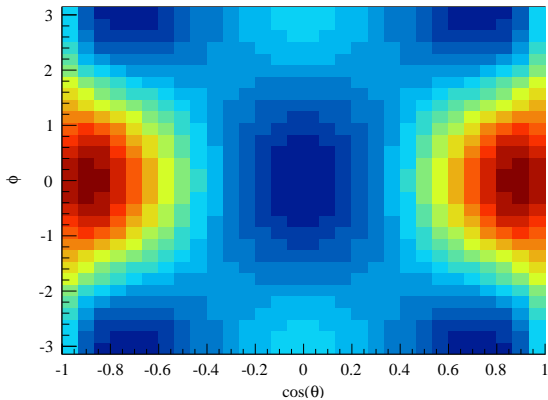
$$\frac{7}{2}^+ : \quad -\mathbf{T}_{\frac{7}{2}^+}^\epsilon \cdot \sqrt{2} \cdot (\mathbf{D}_{\frac{7}{2}^+}^{\frac{7}{2} \frac{1}{2}}(\phi, \theta, 0) + \epsilon \mathbf{D}_{-\frac{7}{2}^+}^{\frac{7}{2} \frac{1}{2}}(\phi, \theta, 0)) \cdot \mathbf{F}_4(\mathbf{q})$$

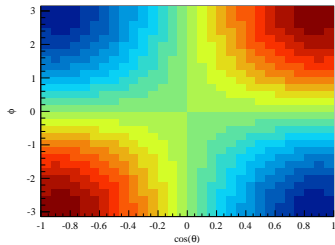
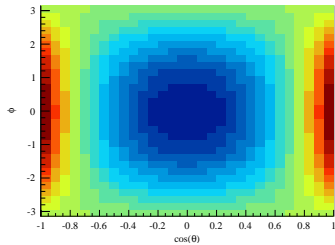
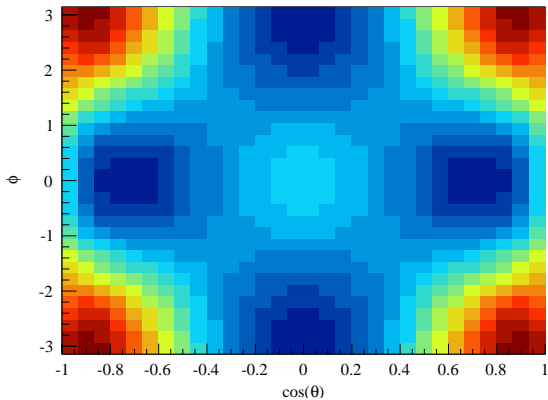
$$\frac{7}{2}^- : \quad \mathbf{T}_{\frac{7}{2}^-}^\epsilon \cdot \sqrt{2} \cdot (\mathbf{D}_{\frac{7}{2}^-}^{\frac{7}{2} \frac{1}{2}}(\phi, \theta, 0) - \epsilon \mathbf{D}_{-\frac{7}{2}^-}^{\frac{7}{2} \frac{1}{2}}(\phi, \theta, 0)) \cdot \mathbf{F}_3(\mathbf{q})$$

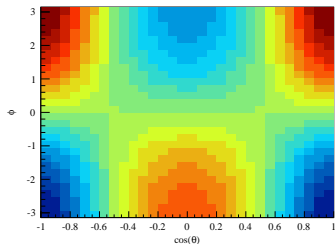
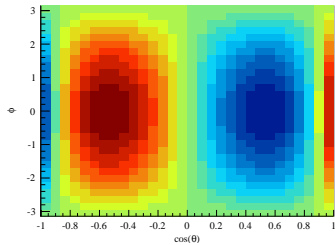
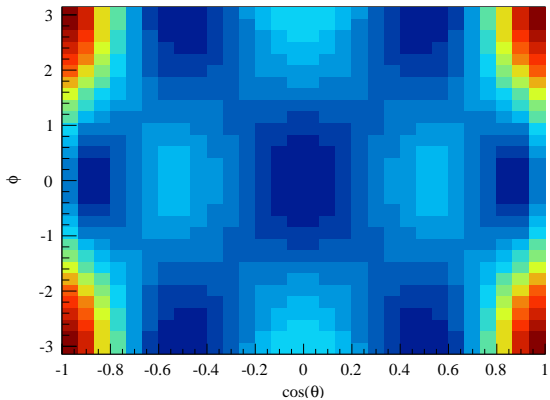
$$\frac{9}{2}^+ : \quad \mathbf{T}_{\frac{9}{2}^+}^\epsilon \cdot \sqrt{\frac{5}{2}} \cdot (\mathbf{D}_{\frac{9}{2}^+}^{\frac{9}{2} \frac{1}{2}}(\phi, \theta, 0) - \epsilon \mathbf{D}_{-\frac{9}{2}^+}^{\frac{9}{2} \frac{1}{2}}(\phi, \theta, 0)) \cdot \mathbf{F}_4(\mathbf{q})$$

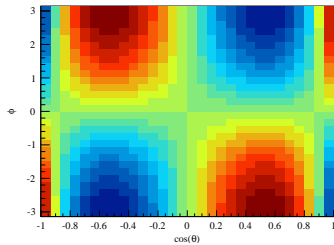
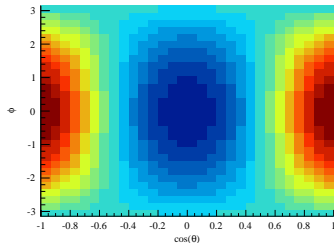
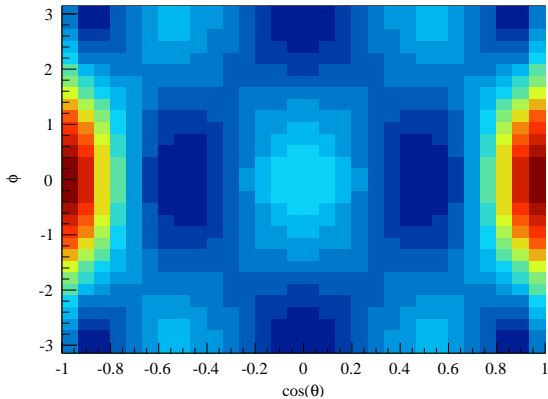
$\frac{1}{2}^+$ 

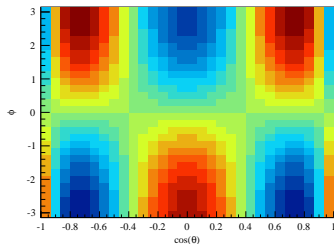
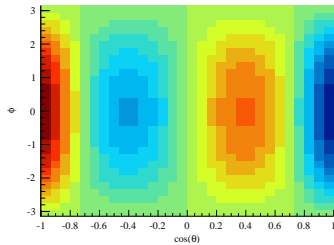
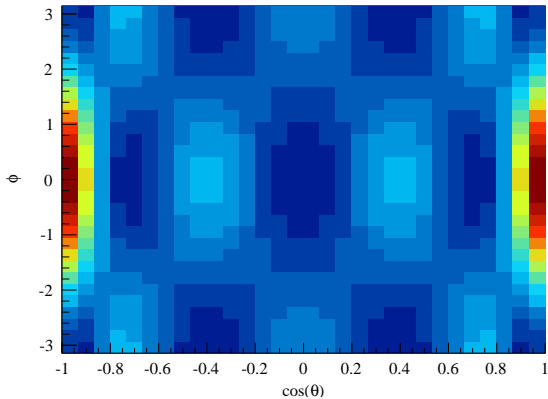


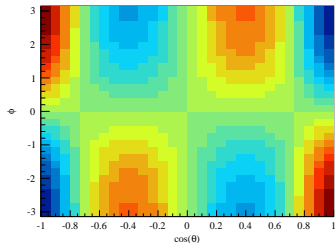
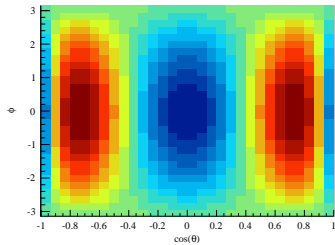
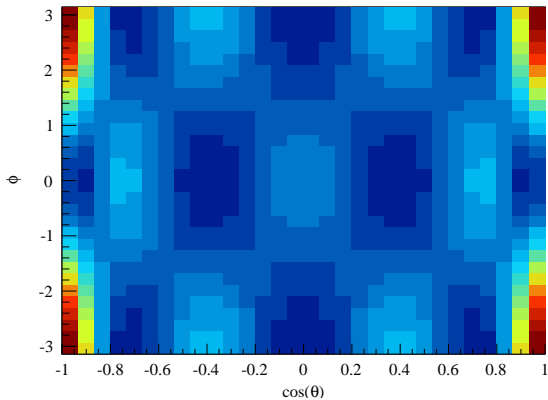


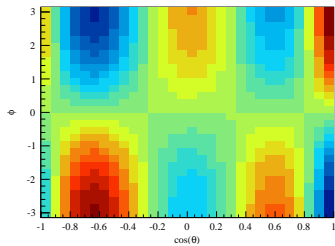
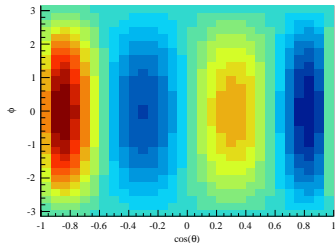
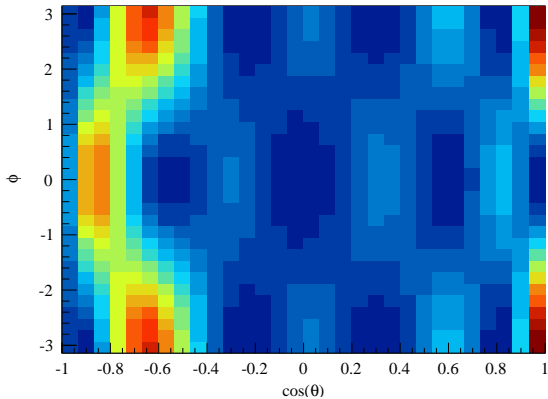


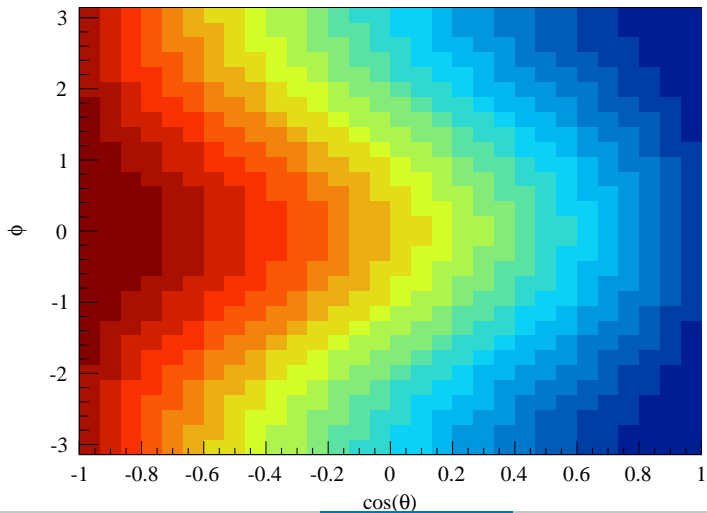


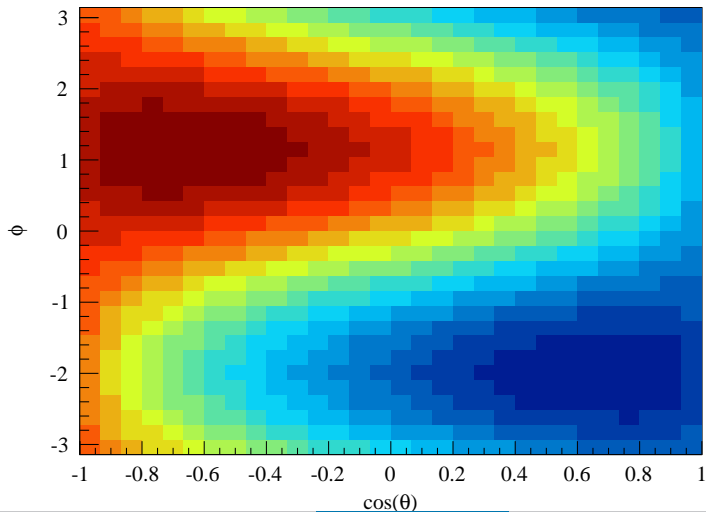


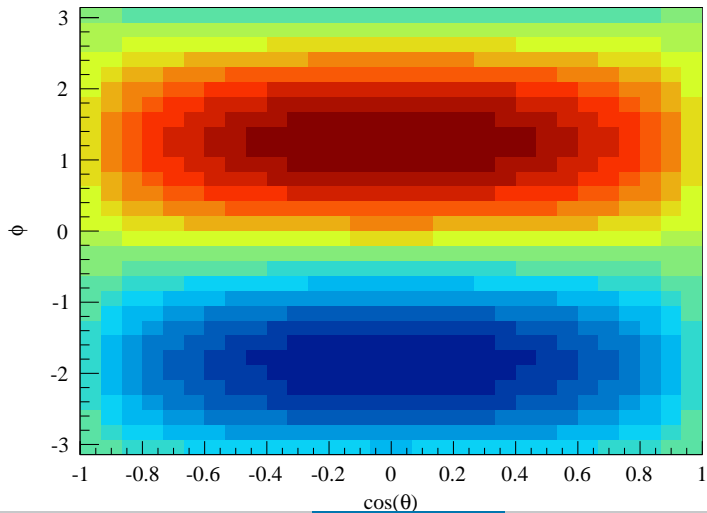


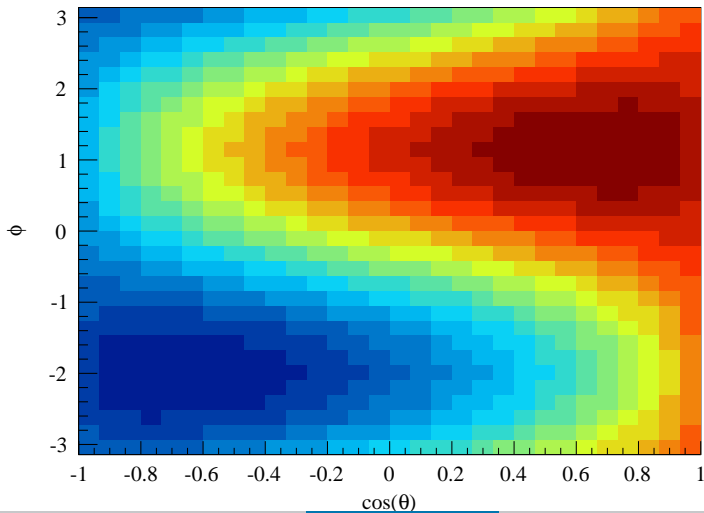


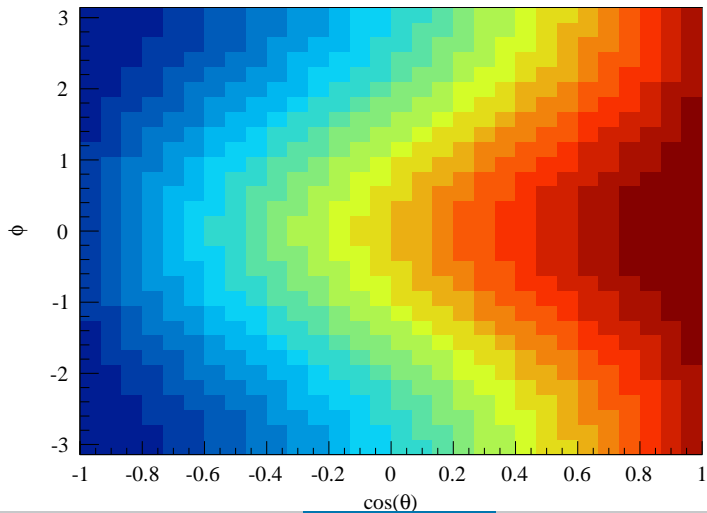


$\frac{1}{2}^+$ vs. $\frac{1}{2}^-$ 0° 

$\frac{1}{2}^+$ vs. $\frac{1}{2}^-$ 45° 

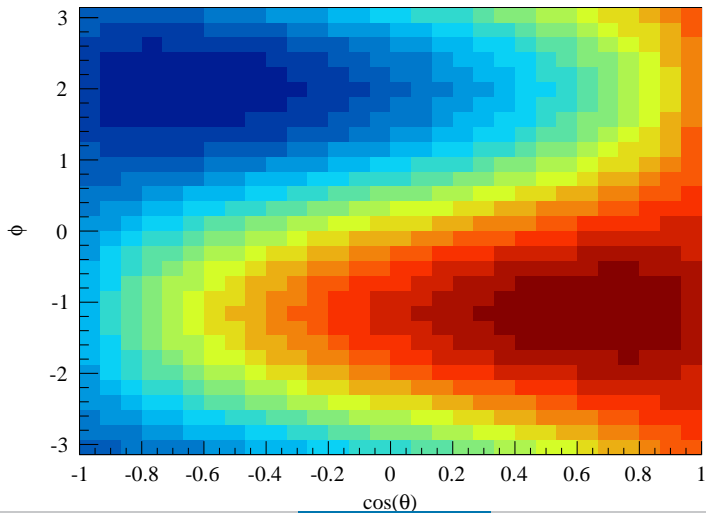
$\frac{1}{2}^+$ vs. $\frac{1}{2}^-$ 90° 

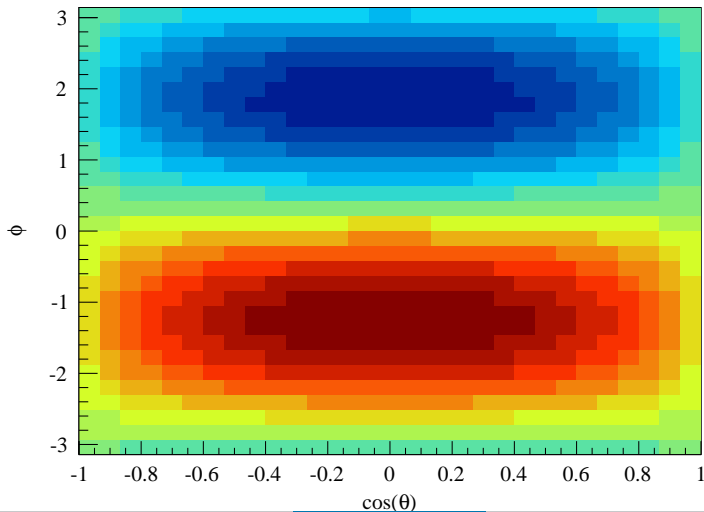
$\frac{1}{2}^+$ vs. $\frac{1}{2}^-$ 135° 

$\frac{1}{2}^+$ vs. $\frac{1}{2}^-$ 180° 

$\frac{1}{2}^+$ vs. $\frac{1}{2}^-$

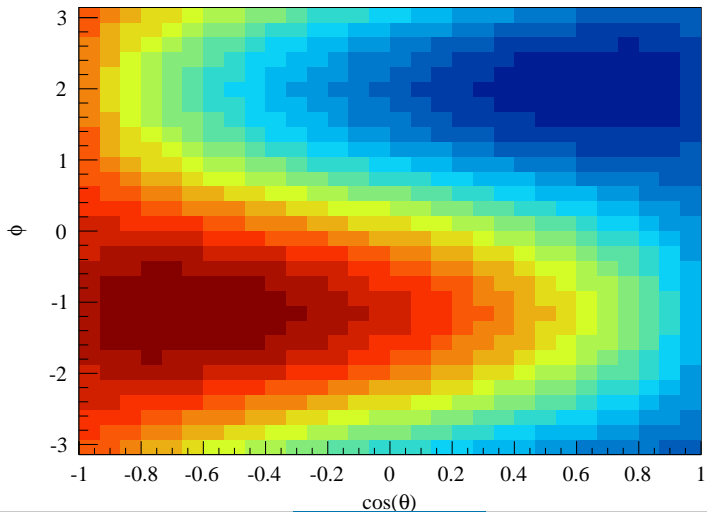
225°

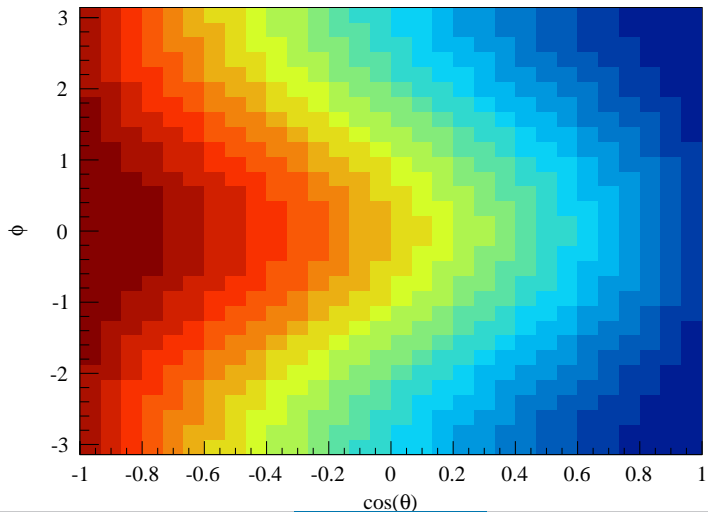


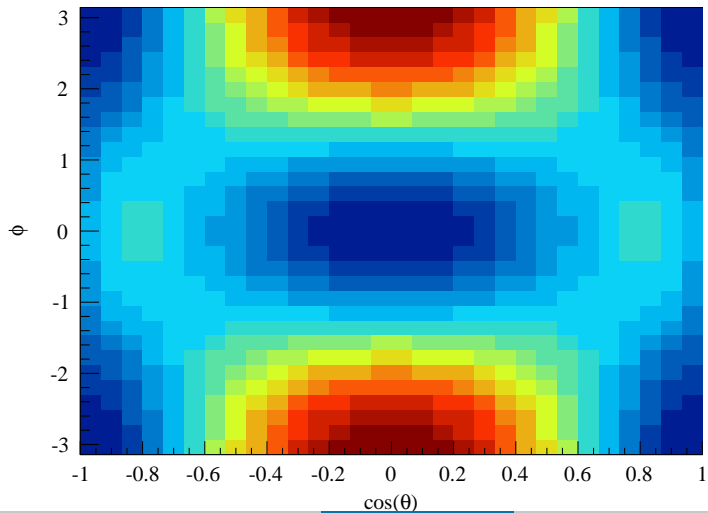
$\frac{1}{2}^+$ vs. $\frac{1}{2}^-$ 270° 

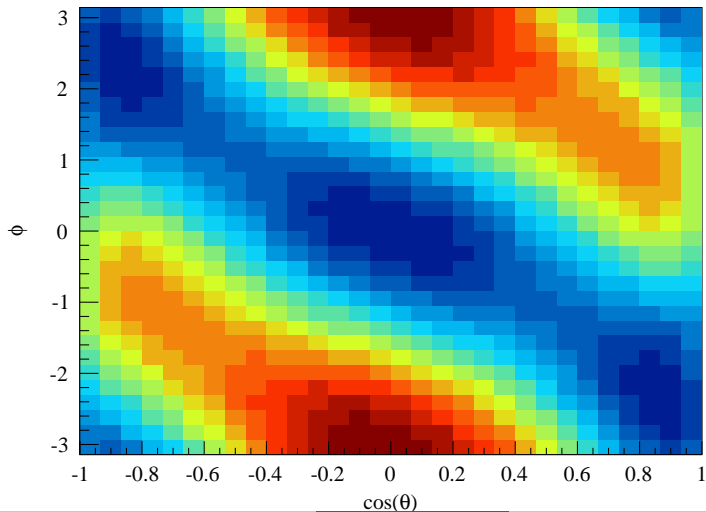
$\frac{1}{2}^+$ vs. $\frac{1}{2}^-$

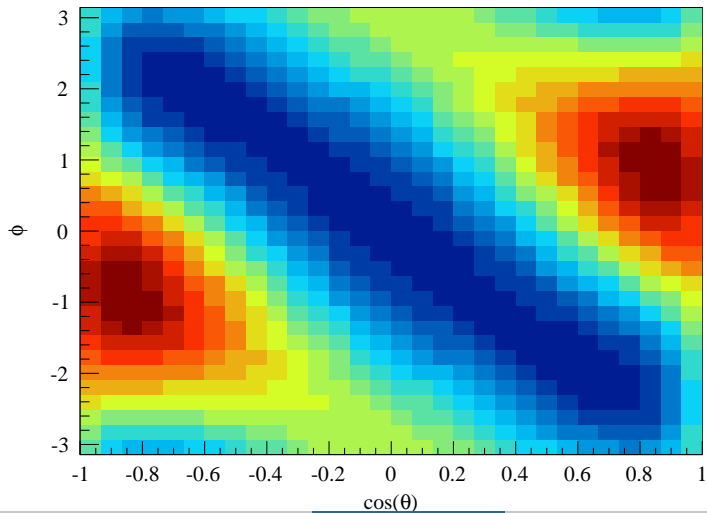
315°



$\frac{1}{2}^+$ vs. $\frac{1}{2}^-$ 360° 

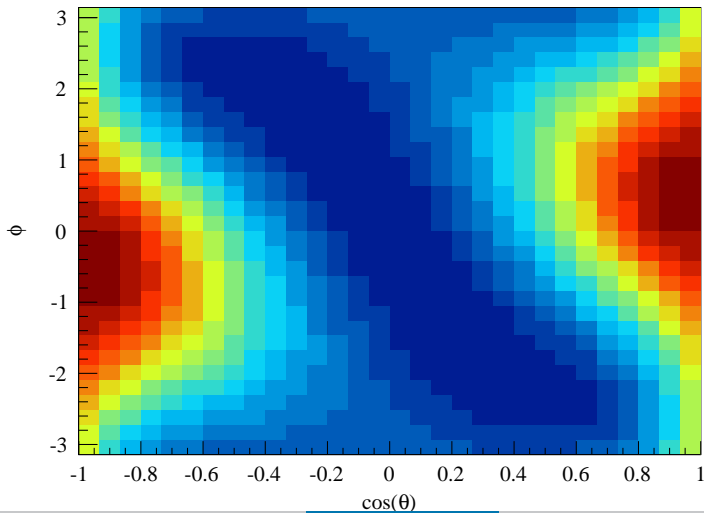
$\frac{1}{2}^+$ vs. $\frac{3}{2}^+$ 0° 

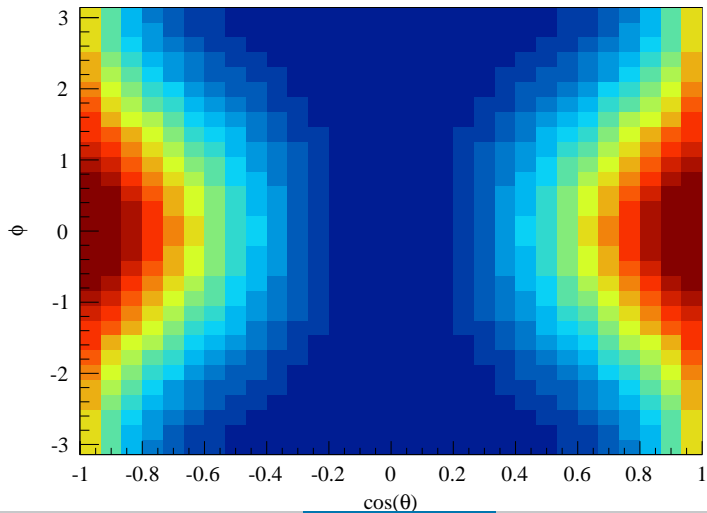
$\frac{1}{2}^+$ vs. $\frac{3}{2}^+$ 45° 

$\frac{1}{2}^+$ vs. $\frac{3}{2}^+$ 90° 

$\frac{1}{2}^+$ vs. $\frac{3}{2}^+$

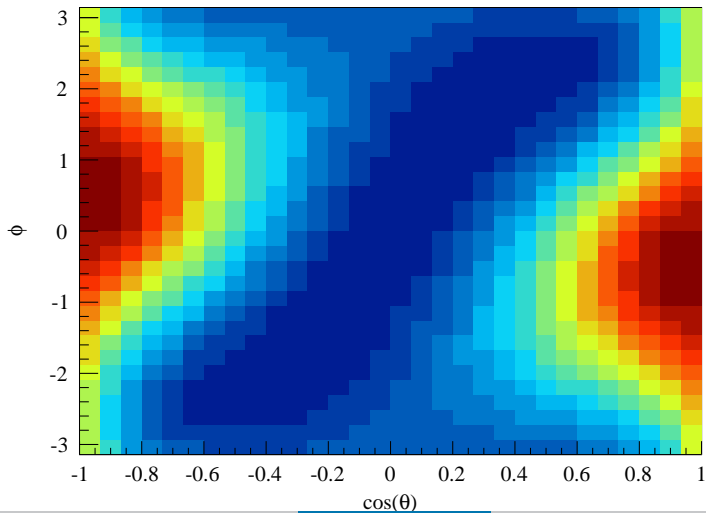
135°

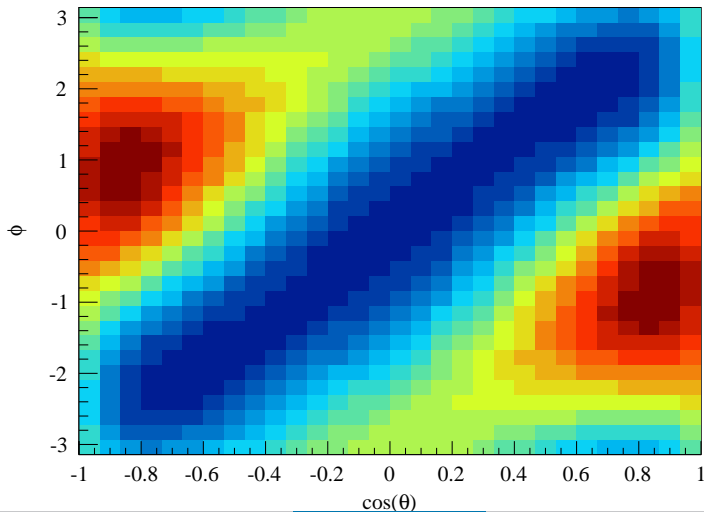


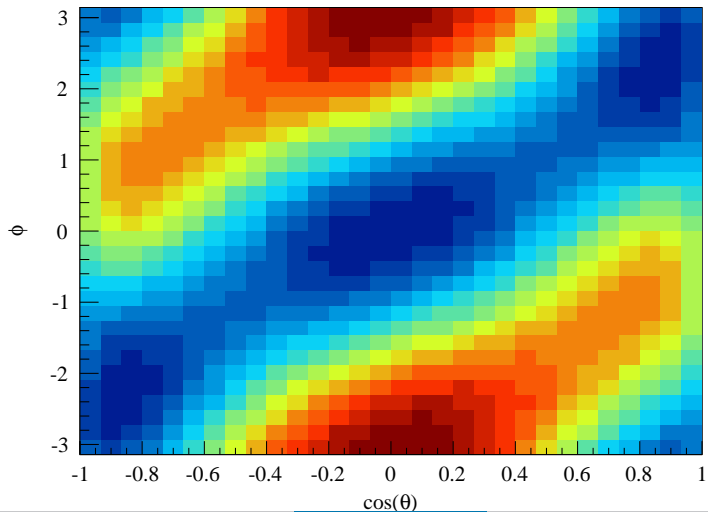
$\frac{1}{2}^+$ vs. $\frac{3}{2}^+$ 180° 

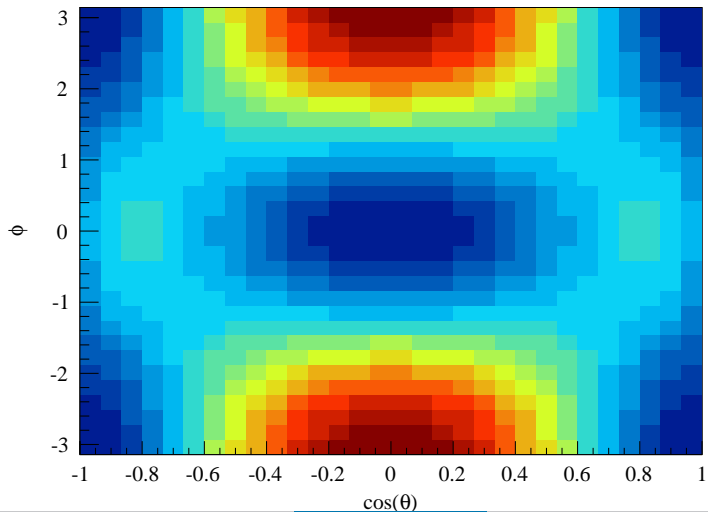
$\frac{1}{2}^+$ vs. $\frac{3}{2}^+$

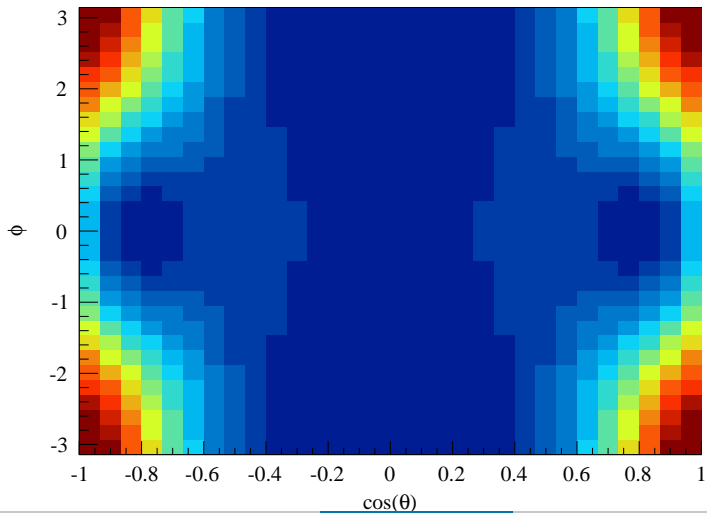
225°

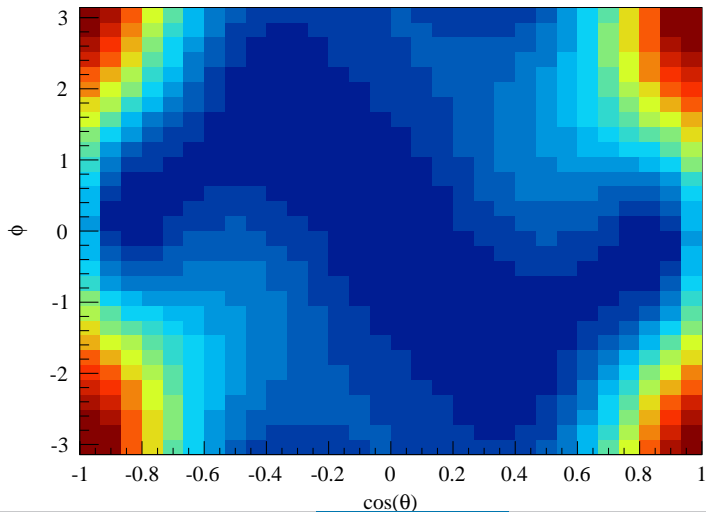


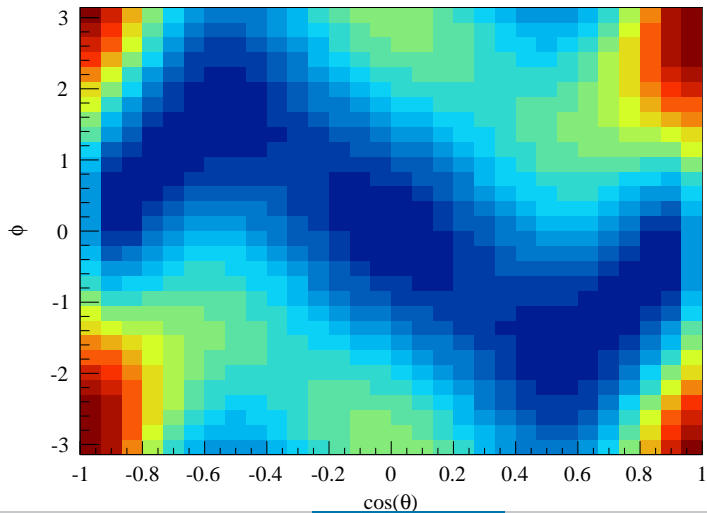
$\frac{1}{2}^+$ vs. $\frac{3}{2}^+$ 270° 

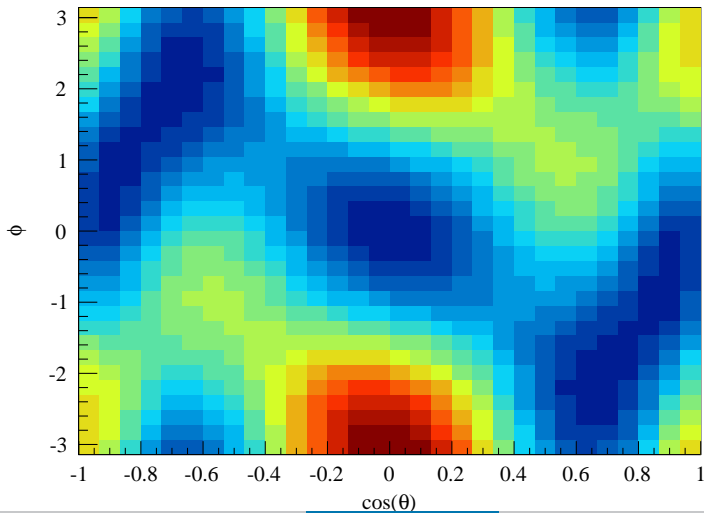
$\frac{1}{2}^+$ vs. $\frac{3}{2}^+$ 315° 

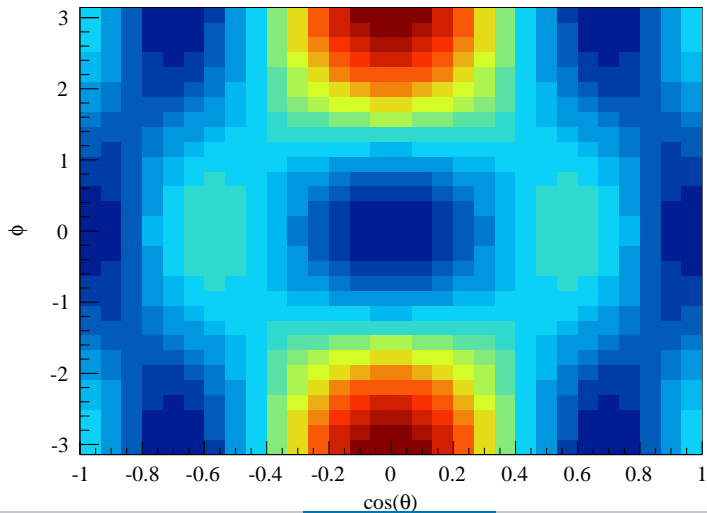
$\frac{1}{2}^+$ vs. $\frac{3}{2}^+$ 360° 

$\frac{1}{2}^+$ vs. $\frac{5}{2}^+$ 0° 

$\frac{1}{2}^+$ vs. $\frac{5}{2}^+$ 45° 

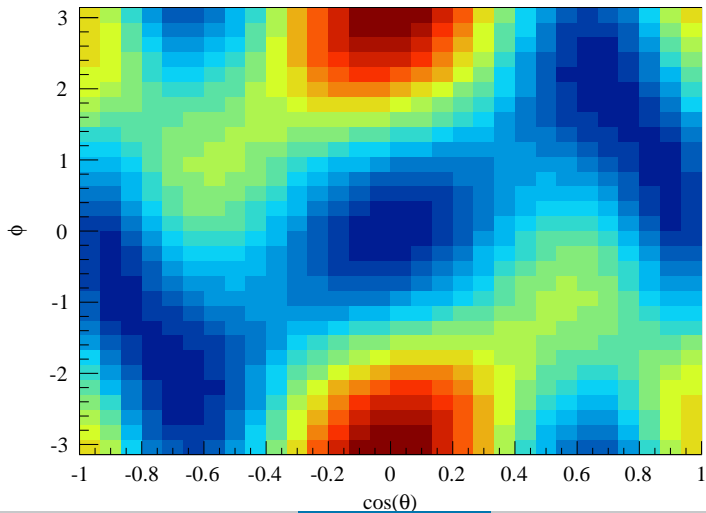
$\frac{1}{2}^+$ vs. $\frac{5}{2}^+$ 90° 

$\frac{1}{2}^+$ vs. $\frac{5}{2}^+$ 135° 

$\frac{1}{2}^+$ vs. $\frac{5}{2}^+$ 180° 

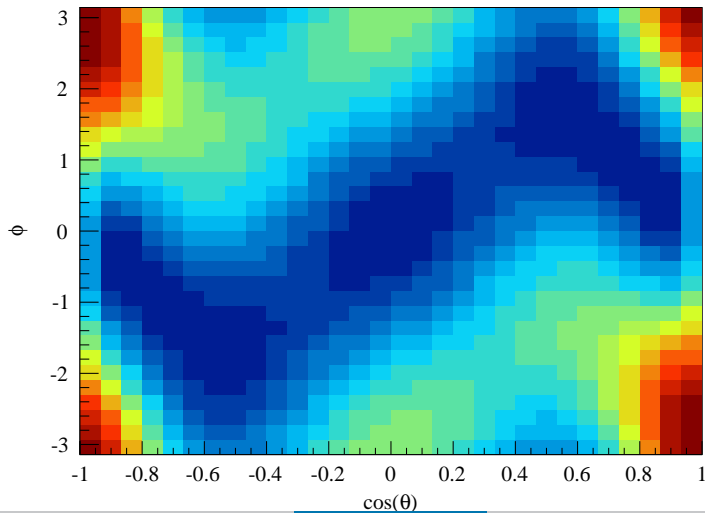
$\frac{1}{2}^+$ vs. $\frac{5}{2}^+$

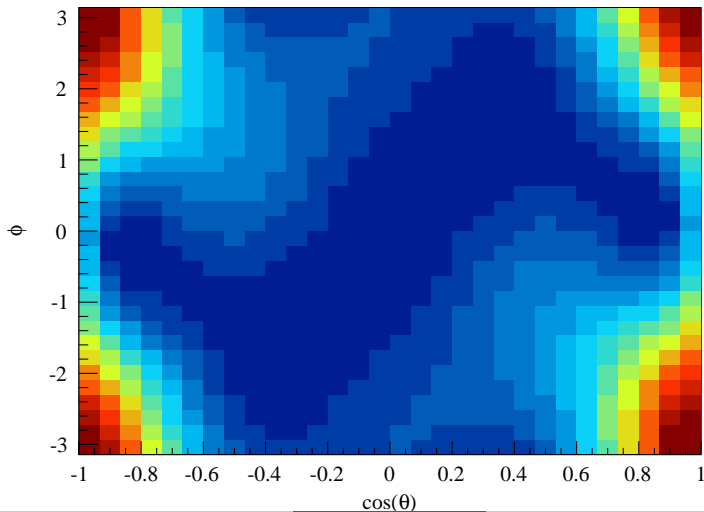
225°



$\frac{1}{2}^+$ vs. $\frac{5}{2}^+$

270°



$\frac{1}{2}^+$ vs. $\frac{5}{2}^+$ 315° 

$\frac{1}{2}^+$ vs. $\frac{5}{2}^+$ 360° 