From Wikipedia

Spherical harmonics with *l* = 4

$$Y_4^{-4}(\theta,\varphi) = \frac{3}{16}\sqrt{\frac{35}{2\pi}} \cdot e^{-4i\varphi} \cdot \sin^4\theta$$

$$Y_4^{-3}(\theta,\varphi) = \frac{3}{8}\sqrt{\frac{35}{\pi}} \cdot e^{-3i\varphi} \cdot \sin^3\theta \cdot \cos\theta$$

$$Y_4^{-2}(\theta,\varphi) = \frac{3}{8}\sqrt{\frac{5}{2\pi}} \cdot e^{-2i\varphi} \cdot \sin^2\theta \cdot (7\cos^2\theta - 1)$$

$$Y_4^{-1}(\theta,\varphi) = \frac{3}{8}\sqrt{\frac{5}{\pi}} \cdot e^{-i\varphi} \cdot \sin\theta \cdot (7\cos^3\theta - 3\cos\theta)$$

$$Y_4^{0}(\theta,\varphi) = \frac{3}{16}\sqrt{\frac{1}{\pi}} \cdot (35\cos^4\theta - 30\cos^2\theta + 3)$$

$$Y_4^{1}(\theta,\varphi) = \frac{-3}{8}\sqrt{\frac{5}{\pi}} \cdot e^{i\varphi} \cdot \sin\theta \cdot (7\cos^3\theta - 3\cos\theta)$$

$$Y_4^{2}(\theta,\varphi) = \frac{3}{8}\sqrt{\frac{5}{2\pi}} \cdot e^{2i\varphi} \cdot \sin^2\theta \cdot (7\cos^2\theta - 1)$$

$$Y_4^{3}(\theta,\varphi) = \frac{-3}{8}\sqrt{\frac{35}{\pi}} \cdot e^{3i\varphi} \cdot \sin^3\theta \cdot \cos\theta$$

$$Y_4^{4}(\theta,\varphi) = \frac{3}{16}\sqrt{\frac{35}{2\pi}} \cdot e^{4i\varphi} \cdot \sin^4\theta$$

$Y_{44} \;\alpha\; (x + iy)^4$
$(Y_{44} + Y_{4-4}) \;\alpha\; x^4 + 2x^2y^2 + y^4$
$Y_{00} \;\alpha\; 35z^4 - 30z^2r^2 + 3r^4$

Therefore we can find $x^4 + y^4 + z^4 - (3/5)r^4 \;\alpha\; Y_{40} + \sqrt{\frac{5}{14}}\,(Y_{44} + Y_{4-4})$