

PHYS 404 and 690-03

Problem Set due on day, Wednesday, April 20, 2011.

Problem Set #6

Saturation Spectroscopy

Explain in your own words and in less than one page, including at least one figure of your own making, why there is a third peak in saturation absorption spectroscopy that is exactly midway between the two optical frequencies of the $5S_{1/2} F=2 \leftrightarrow 5P_{1/2} F=2$ and $5S_{1/2} F=2 \leftrightarrow 5P_{1/2} F=1$ transitions. This third peak is referred to as a cross-over resonance. While a qualitative discussion of the effect is necessary, any quantitative explanation is also helpful. Use of references (journals, on-line, books, etc ...) is permitted and encouraged, though these should be cited.