Reviews for submissions to the USD Journal of Undergraduate Physics Research

title of paper reviewed: op–fleet admiral welsh's paper

March 14, 2013

Abstract

Please proofread the enclosed manuscript. The author will be helped by your comments; please write with this in mind. Return the marked up copy and send a .tex, .dvi, or .pdf copy of the answers to the questions below in an email to Dr. Severn.

1 General Questions

1. Did you find any physics errors or mathematical errors? Was the logical underpinning of the arguments and explanation strong or weak? This is *really* of first importance. **It's subtle, on p3 section III.A. I think the author expresses the view near the bottom of the page that an external magnetic field can cause hyperfine splitting. This is a misconception, and I wonder how it might influence the author's thinking. In the introduction I think there is a hint of this (see comments). A minor thing–half wave plates rotate the plane of polarization, not from plane to circularly polarized light.**

2. Did the writer adequately explain how the experiment works, both at the advanced, modern physics level, and at the more basic and practical classical physics level?

   Yes. He is hampered a little bit by a misconception that I inculcated, namely that the quarter wave plate lets pass both rhcp and lhcp light. It's a lie, only one of these gets through. The experiment would not work if both did. I believe the author would know why. And he should fix up the paper to reflect that knowledge, and he should put the 'here's how optical pumping works', in the section so marked.

3. Is the manuscript complete? That is, does it describe all of the prescribed experiments and results? **yes**

4. Did the abstract tell directly and concisely about what done and what were the results? **yes**

5. Did the author help provide a sense of background interest in the experiments? Was it clear why the experiments provide useful scientific knowledge? Did the author explicitly describe

the organization of the paper, and did the author stick with it? **The intro lacked a clear statement of the purpose of the measurements.**

6. Were the attempted experiments clearly described? **Yes, but see above.**

7. Were their results adequately explained? **No. The quadratic stuff is missing, and why not show the dips?**

8. Is it clear that author has revised the submitted draft and has proofread it for errors? **there are comma splice errors. Also there are latex formatting errors. There was one problem w. diction (chosen word not quite right), and so forth.**

9. Were the 3 rules for formatting mathematical prose scrupulously followed? **yes.**

2 Short responses to be made at the discretion of the reviewer

- Was there anything you wished to know more about which if added could improve the paper (or anything which should be left out)? **experimental uncertainty, quadratic zeeman effect *results***

- Any general comments about the paper? **see comments on manuscript**