REVIEWS ON THE MANUSCRIPT [23]

Reviewer 1:

The manuscript is well structured and understandable. The solution of the problem (numerical model + experimentally determined parameters) is very straightforward. I have seen the presentation on IYPT 2011 and I was satisfied with the presentation, too.

In spite of that, I have a few comments to the manuscript:

1. In the denominator of Eq. (1) should be r^3 instead of r^2 – must be corrected.
2. Page 2, line 7 from the top: Why the two current loops should cancel the magnetic field in the inner area? Figure2 clearly shows that the bottom magnet produces nonzero field in the inner area. Please, explain or correct. In my opinion, the currents in both (inner and outer) loops should be the same.

Next comments aim to the improvement of the manuscript.

3. Can be numerical values of the models of magnets (e.g. currents and radii of loops) shown in the manuscript? This information can be very interesting for the reader.
4. To the equations (3)-(5): The magnetic force calculation was explained earlier in the manuscript. Can be also the numerical values of the mass and the dimensions of the top shown in the manuscript?

Conclusion: I recommend to publish the manuscript.

Points 1. and 2. have to be corrected/explained. Points 3. and 4. are not such important, but should be incorporated into the manuscript, if possible.

Reviewer 2:

The paper is very clear, well written and with good English and structure. It should be accepted.

The description of the device and procedures are clear and adequate references are given. In addition to performing detailed calculations the authors show a very good intuitive understanding of the stability of the top.

The authors may, however, consider the following point: It could be made clearer how the measured values for the magnetic fields in figure 3a were obtained. I assume with some kind of magnetometer.

Reviewer 3:

Comments

The paper presents a numerical model which after comparison with experiments serves as a basis for an investigation of stability.

The strongest and weakest aspect of the paper

The strongest aspect of the paper is the numerical simulation which was verified

to reproduce the experimental results, and is then used to predict the stability of the system.

The weakest aspect is the lack of details of the experiment.

Organization and presentation

The paper is well structured. The writing is clear and comprehensive.

Style

(1) Some minor language problems - please seek an advice from a friend

(2) I would suggest not using the word 'weight' for gravitational force.

Additional questions & remarks

• What were the details of the experimental setup? Describe it briefly in a few sentences and/or in a photo/scheme.

• Without the parameters of the Levitron given, the values of ω are not illustrative. You could also add a citation to a paper presenting various limitation of this type (e.g. your reference [2]).

• How is the fig. 3a generated? How were the measurements conducted? More details are needed in this part. You could try to illustrate the deviation from the theoretical predictions in a graph choosing the angle as the measured quantity. There are no units in the graph.

• All figures the tiny axes description; please enlarge it to be readable.

• Is it possible to generate a theoretical value for $\omega_{spin}/\Omega_{precession}$? If yes, you could include it in the graph - that would be very illustrative to see if there is a quantitative agreement here.

References

The references are chosen properly. Please add the year and the journal to ref. [5] and other authors to ref. [2], as there were 3 authors (the same applies for all papers).

Recommendations

Please add some comment on the conducted experiments and check all the remarks from the review.

Summary

The manuscript is recommended for publication after some revision.

Editorial request

Et all: et al.

Figures 3b, 5b: provide units on the x-axis.

gr: g

Ref. 4, 5: provide more detailed and accurate references.