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The lead zeppelin : a force sensor without a handle

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Stellingen

behorend bij het proefschrift

*The Lead Zeppelin
a Force Sensor without a Handle*

- I. Non-linear mixing between vibrational modes of the Lead Zeppelin sensor is manifested in frequency, as well as in shorter ringdown times.
Chapter 4 of this thesis.

- II. The Lead Zeppelin sensor offers a promising approach for doing a gravitational force measurement between source masses smaller than ever before.
Chapter 5 of this thesis.

- III. The damping of the motion of the Lead Zeppelin sensor is dominated by surrounding Helium gas.
Chapter 4 of this thesis.

- IV. SQUID detection of the Lead Zeppelin sensor's motion is so sensitive to current noise in the levitation coils, that without a persistent current switch the motion can be detected only if a wire between pickup coil and SQUID is broken.
Chapter 4 of this thesis.

- V. Being designed for superconducting magnetic energy storage, the decay time of 3 hours that the magnetic persistent current switch of *K. Goto et al.* provides when connected to a test coil of 2 Henry, is rather disappointing.
*K. Goto et al.,
IEEE Trans. Appl. Supercond., vol. 9, p. 173, 1999.*

- VI. In their theoretical discussion of a magnetically levitated superconducting sphere, *Romero-Isart et al.* fail to consider the downward effect of gravity which can pull the sphere out of the linear part of the levitating force.
*O. Romero-Isart et al.,
Phys. Rev. Lett., vol. 109, p. 147205, 2012.*

- VII. Assuming superhigh quality factors for optically levitated nanospheres by an extrapolation based on going to a lower background pressure, is misleading because other damping mechanisms are bound to occur.
- VIII. The importance of the experiment proposed by *Romero-Isart et al.* which would put a living organism (e.g. a bacterium) in a quantum superposition, cannot be overestimated; it not only explores the unknown boundary between classical and quantum mechanics, but also has far-reaching philosophical implications on the interpretation of quantum mechanics in the big world.
- O. Romero-Isart et al.,
New J. Phys., vol. 12, p. 033015, 2010.*
- IX. The Lead Zeppelin and rock group Led Zeppelin are much alike. Both operate in a competitive field, have a necessity for synchronous collaboration of all of their individual components, and lean on the ideas of others.