

NMSU Superconductor Gravity Experiment

Hamilton Carter



Physica C 203 (1992) 441–444
North-Holland

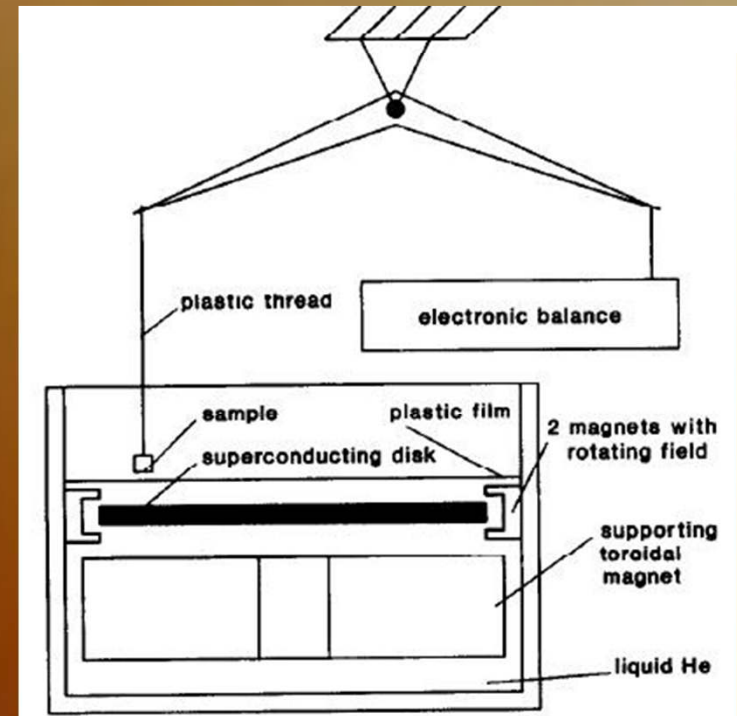
PHYSICA C

A possibility of gravitational force shielding by bulk $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ superconductor

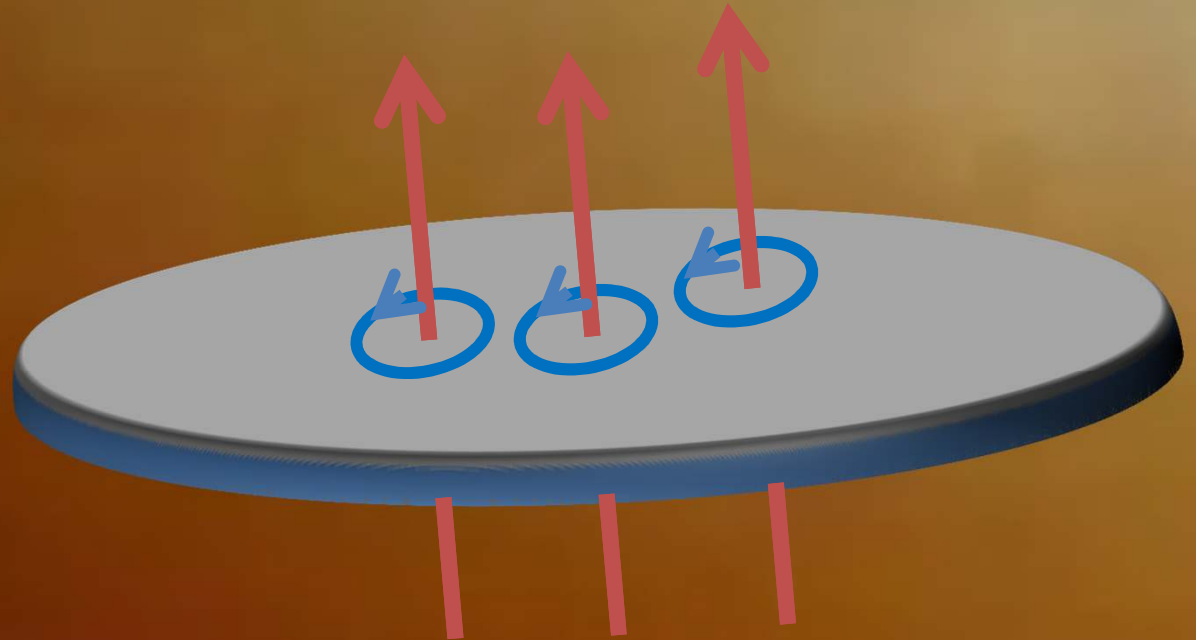
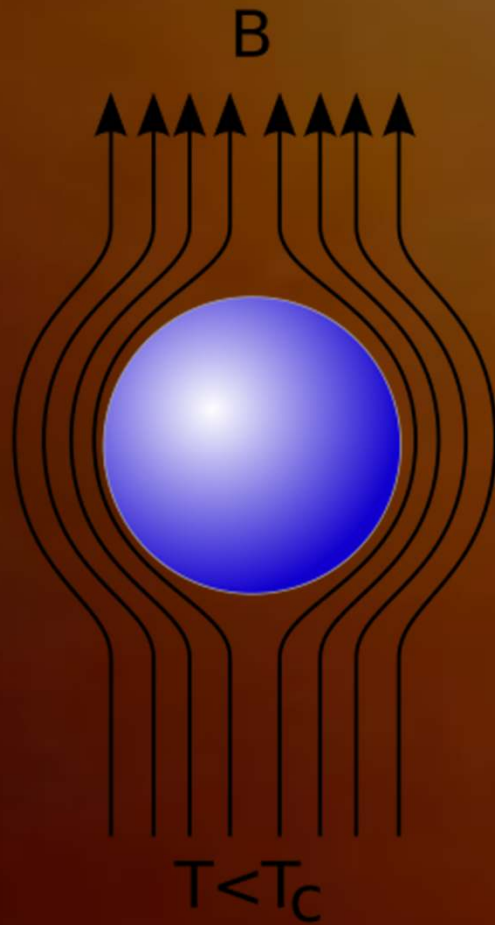
E. Podkletnov and R. Nieminen

Tampere University of Technology, Institute of Materials Science, P.O. Box 589, SF-33101 Tampere, Finland

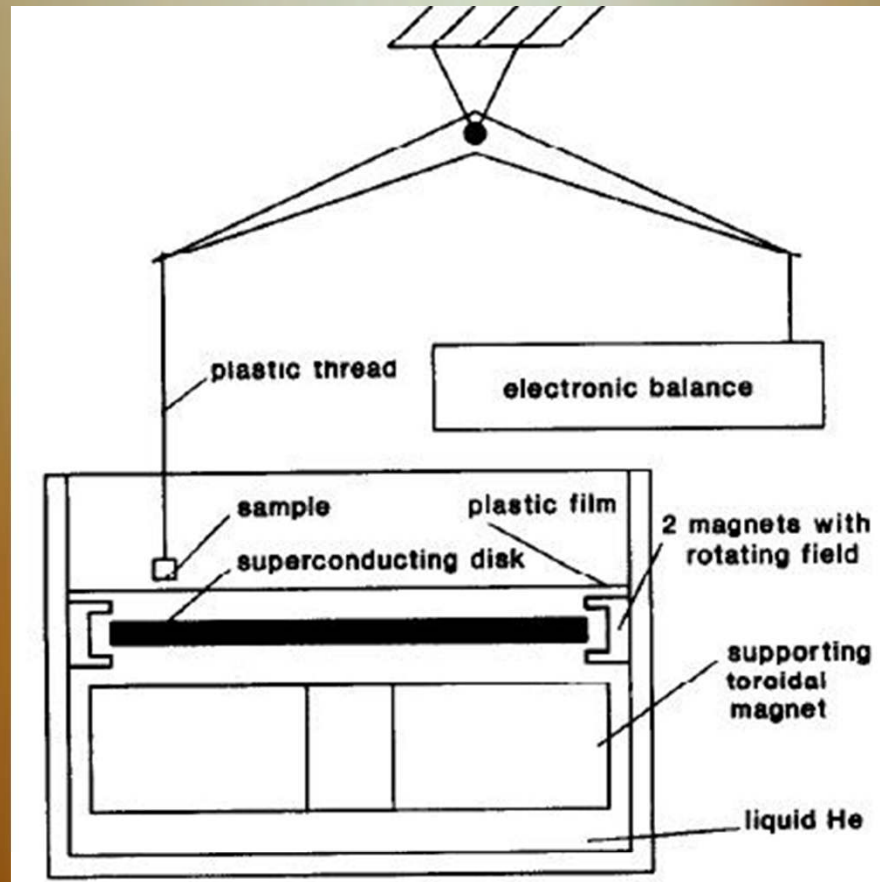
Small percentage change in measured weight of objects suspended above operating apparatus.



Type I & II Superconductors





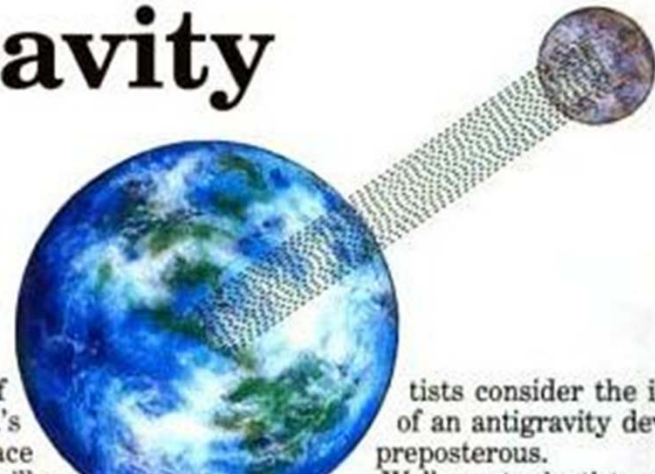


Podkletnov specifies at least 50 kHz magnetic field

SCIENCE

NASA's Antigravity Machine

BY JIM WILSON, Science/Technology Editor



● What goes up must come down. Well, maybe not.

Later this month, NASA researchers hope to conduct an experiment that could determine if the force of gravity might some-

learned that a group of researchers at NASA's Marshall Manned Space Flight Center in Huntsville

tists consider the idea of an antigravity device preposterous.

Well, most scientists, any- Ron Koczor, a researcher at Marshall Space Flight

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Scientists have historically dismissed talk of antigravity as a pipe dream. But in a surprising departure from its long-standing policy of openness, NASA did not invite the press to the conference. However, after interviews with attendees, POPULAR MECHANICS has

Podkletnov claimed that a mass suspended over a chilled superconductor disc weighed less when the disc was rotated inside a magnetic field.

It is helpful to know there are two complementary but not mutually exclusive ways to view gravity as an attraction between two masses (see illustration at top of page). Albert Einstein's general theory of relativity suggests mass actually causes space-time to warp around it. Imagine, for instance, the indentation created by placing a bowling ball on a soft bed.

Both theories explain why apples fall from trees. Scientists consider Einstein's theory superior because it explains also why light—which has no mass—appears to bend in strong gravitational fields. Light, as the theory goes, follows the mass-induced curve in space-time (see illustration on opposite page).

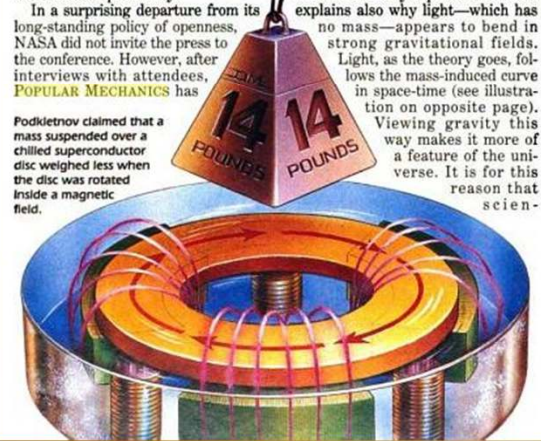
Viewing gravity this way makes it more of a feature of the universe. It is for this reason that scientists

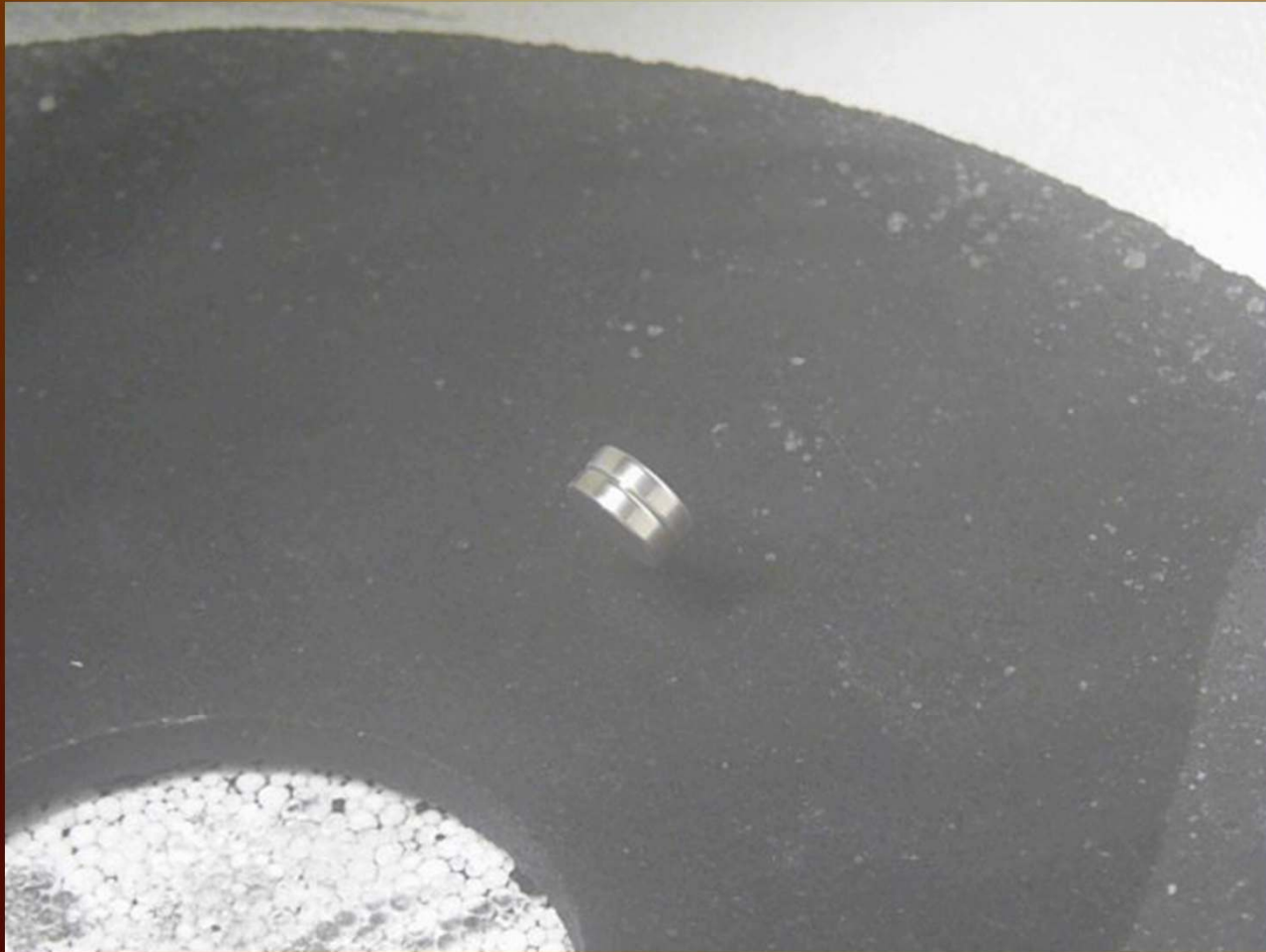
with high-temperature ceramic superconductors," Koczor says. "The device at experiment is a thin disc of superconductor that is rotated at high speeds, up to several thousand rpm, in the presence of an external magnetic field. In the course of the tests, Podkletnov noted that objects above the rotating disk showed a variable but measurable loss of weight, from less than .5% to about 2%. He had no explanation," explains Koczor.

Podkletnov collected data from his experiments for nearly four years and compiled it in a paper that was accepted for publication in the prestigious *Journal of Physics*. But the paper never appeared. Several days before its scheduled publication in the fall of 1996, Podkletnov told his story to the *London Sunday Telegraph*. Other reporters attempting to confirm the story learned that one of Podkletnov's co-authors claimed to have never worked on the project.

Podkletnov withdrew his paper and returned to the faculty of the Moscow Chemistry Science Research Centre. For many journalists, the situation was beginning to look like the cold fusion debacle. They quickly backed off from the story.

Not everyone was dissuaded by Podkletnov's refusal to publish his work. Seven years earlier, Ning Li, a theorist who worked with NASA's Marshall center, had developed a theory suggesting that a superconductor rotated in a strong magnetic field could disrupt the gravitational force in its immediate vicinity. Three of her papers were sub-





Gravity modification experiment using a superconducting disk and a rotating magnetic field

G. Hathaway*, B. Hathaway

Hathaway Consulting Services, 180 Beverley Drive, Santa Fe, NM 87505, USA

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Podkletnov specifies at least 50 kHz magnetic field

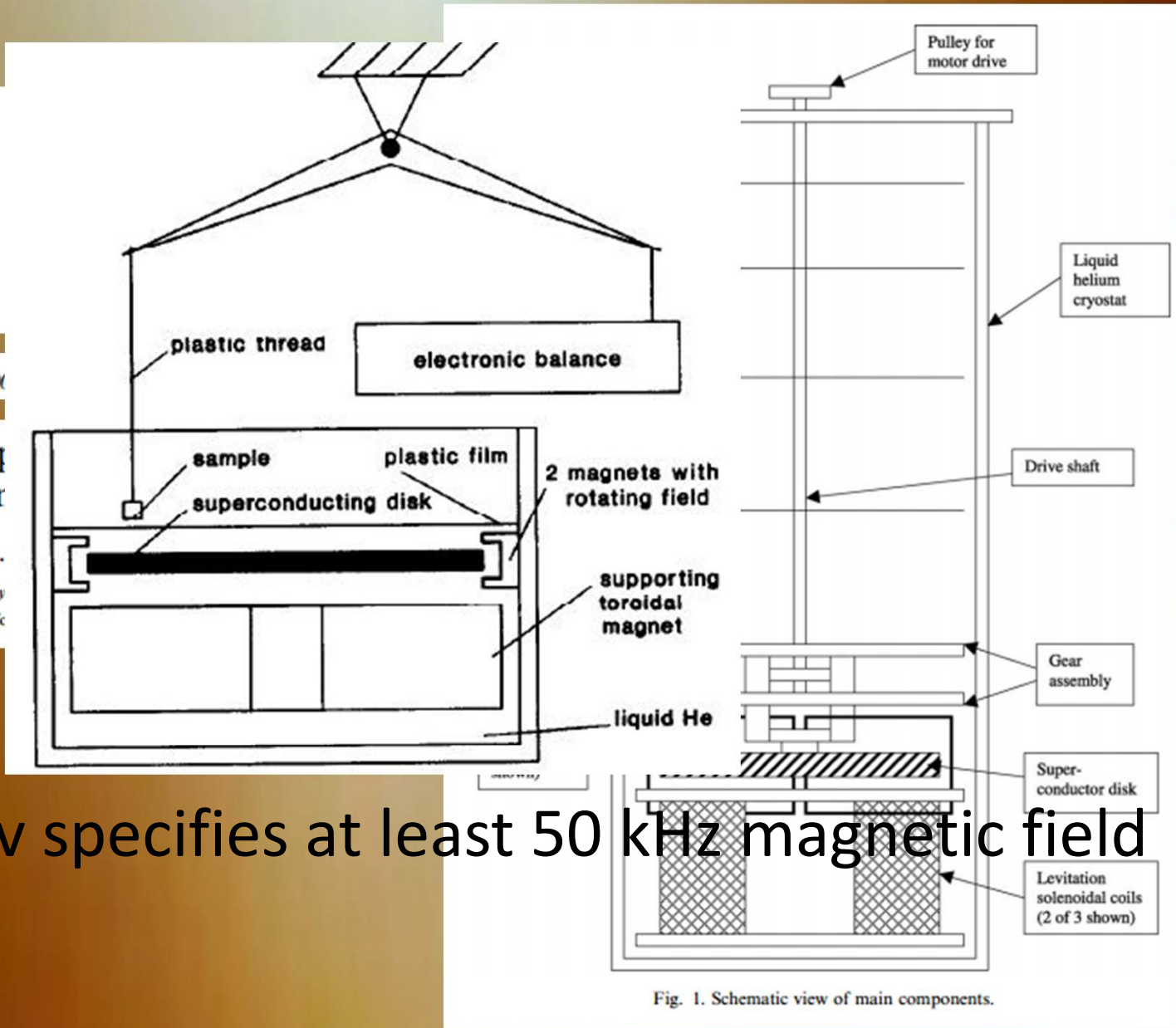
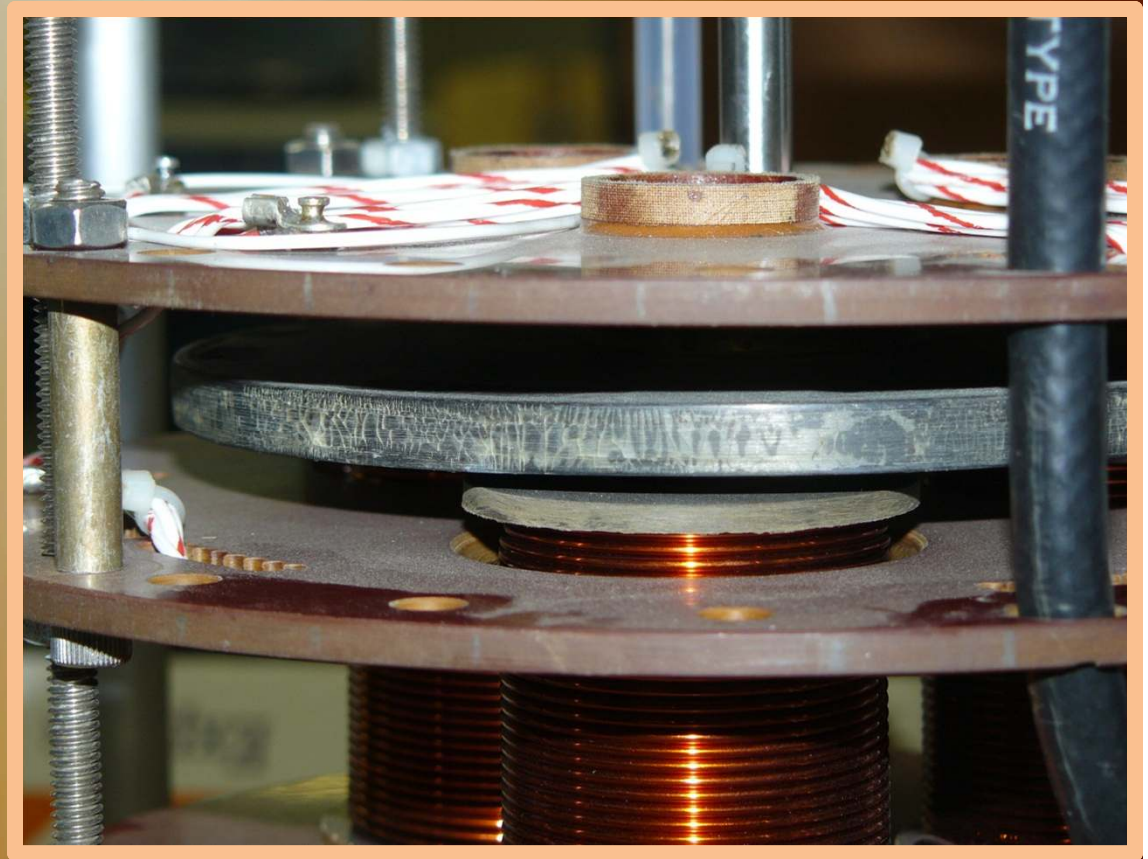
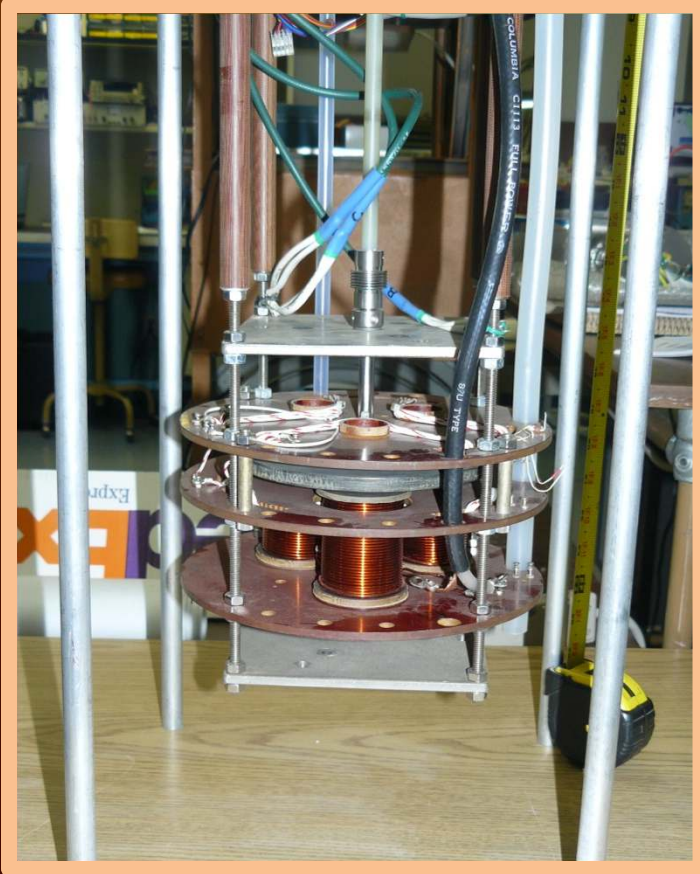


Fig. 1. Schematic view of main components.

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Hathaway Levitation Results

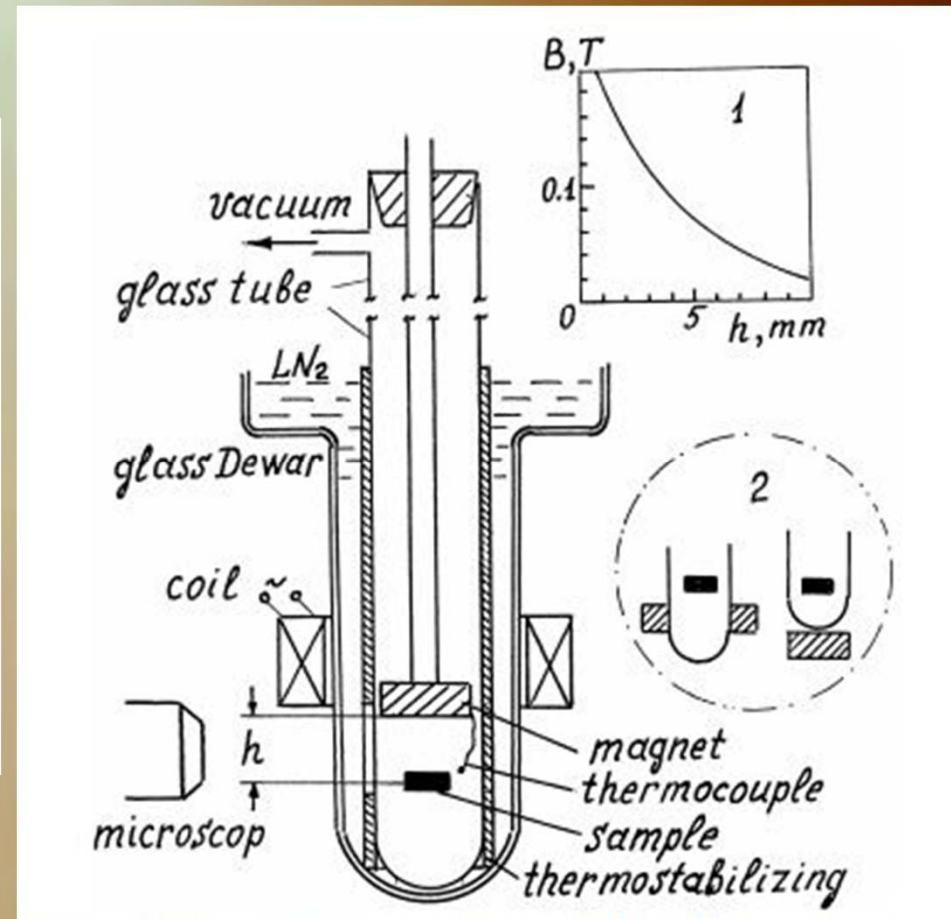
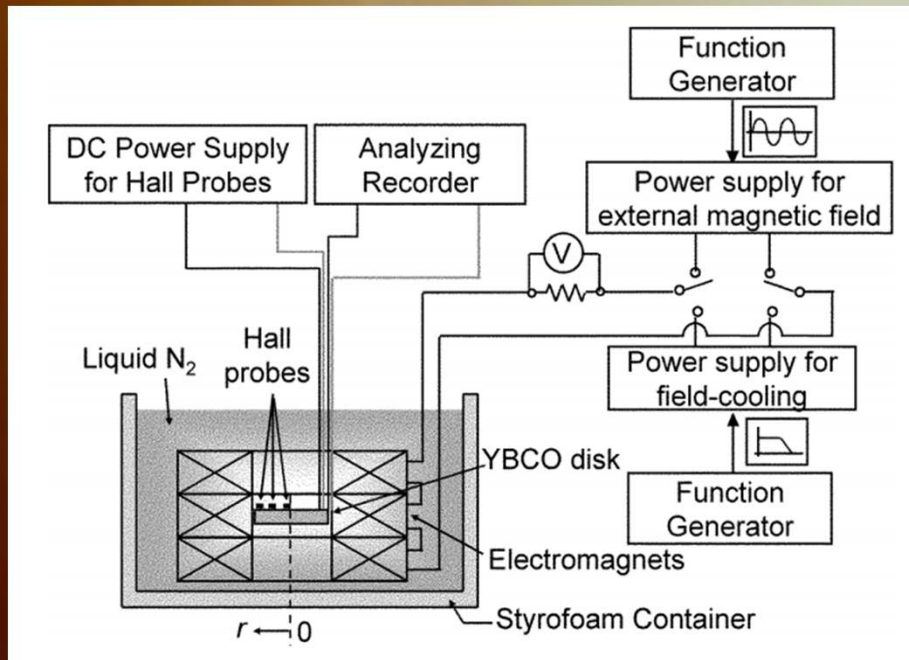
Frequency	Coil Core	SC Type	Coolant	Levitation
60 Hz	Soft Iron	Melt Textured	Li Ni	Yes
100 - 2000 Hz	Soft Iron	Melt Textured	Li Ni	No
5000 Hz	Air	fine powder YBCO	Li He	Yes
>5000 Hz	Air	fine powder YBCO	Li He	No
100000 Hz	Air	any	Li He	No

- Podkletnov specifies at least 50 kHz and a coarse powder disc





Ueda & Smolyak



Trapped Field Characteristic of HTS Bulk in AC External Magnetic Field

Hiroshi Ueda, Manabu Itoh, and Atsushi Ishiyama

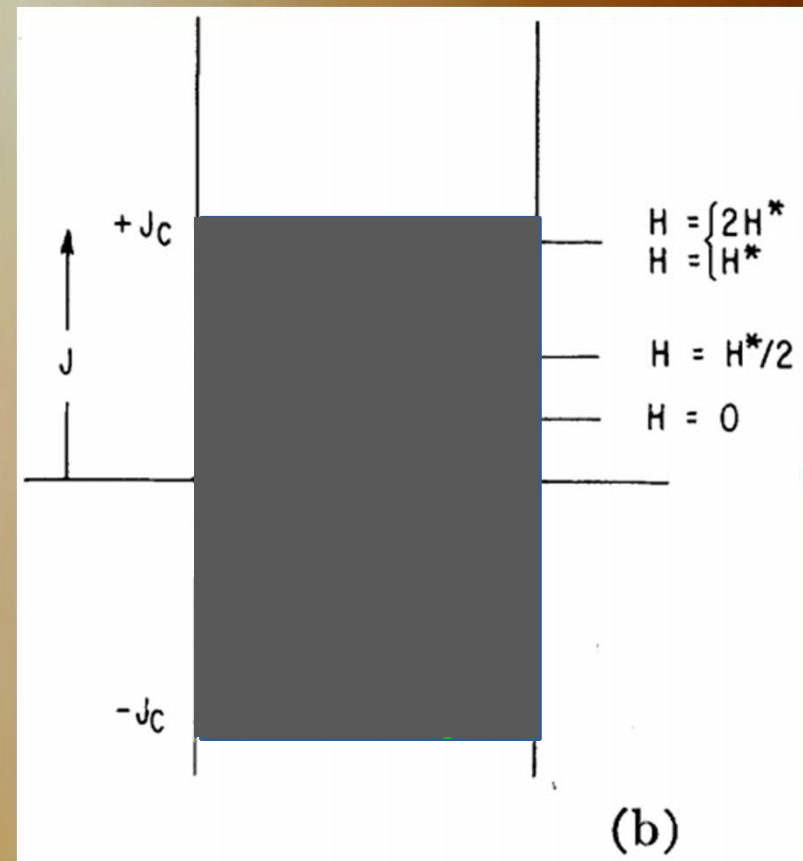
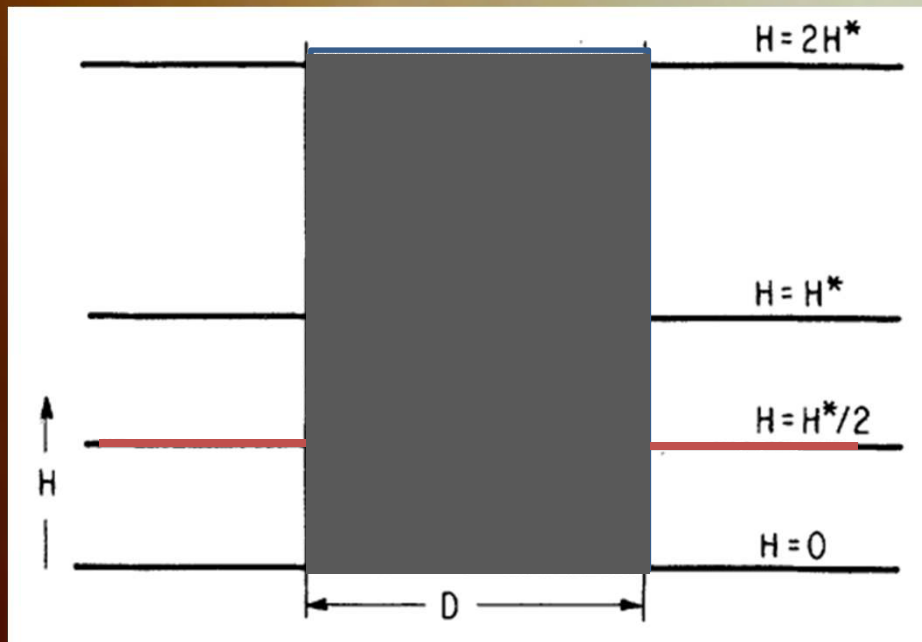
Physica C 302 (1998) 23–30

The instability of levitation of high-temperature superconductors subject to an alternating magnetic field

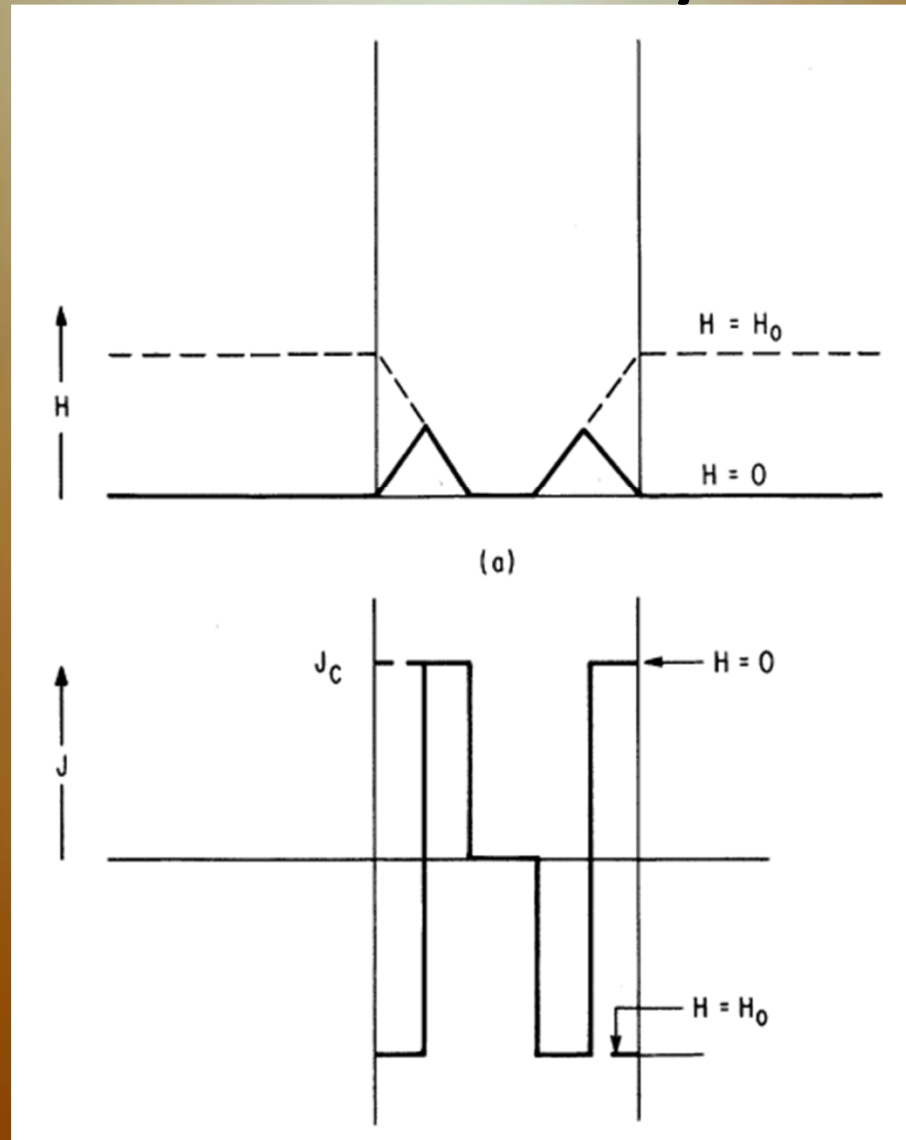
B.M. Smolyak ^{a,*}, M.V. Babanov ^a, G.V. Ermakov ^a, I.B. Smolyak ^b, S.V. Naumov ^b



Bean's Model



Bean's Model - Hysteresis



Trapped Field Characteristic of HTS Bulk in AC External Magnetic Field

Hiroshi Ueda, Manabu Itoh, and Atsushi Ishiyama

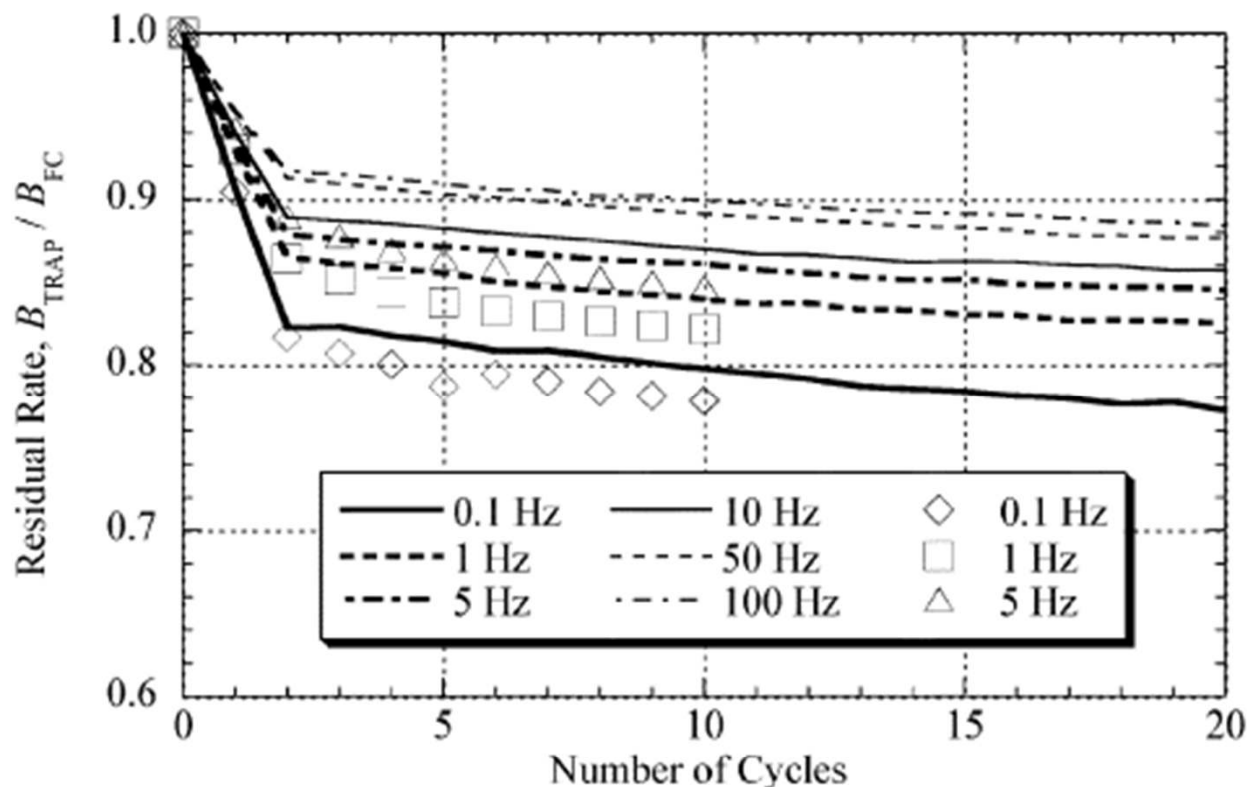
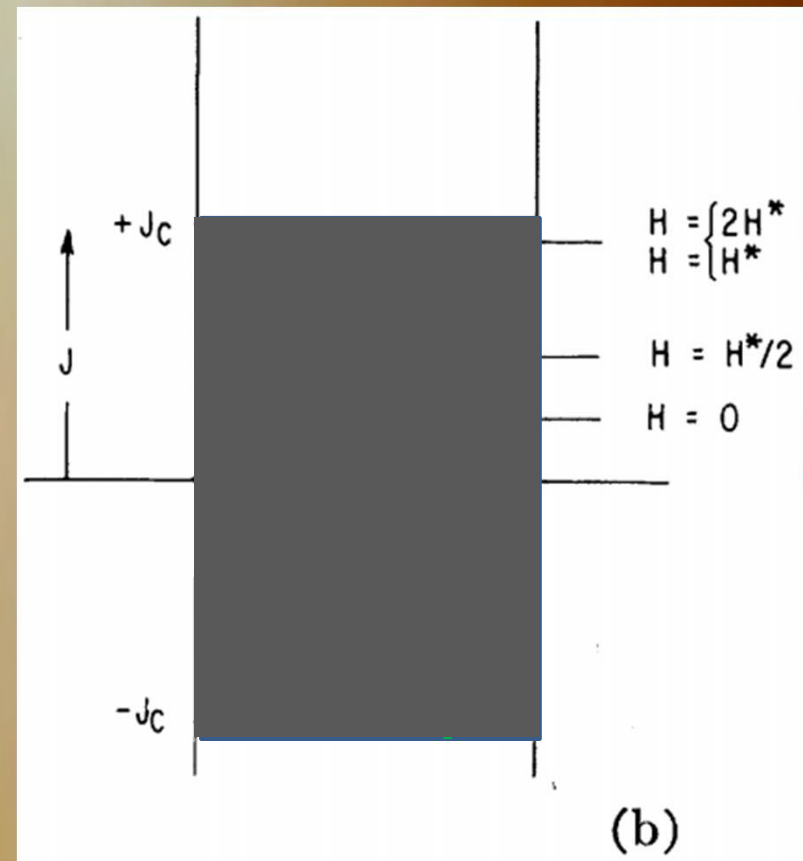
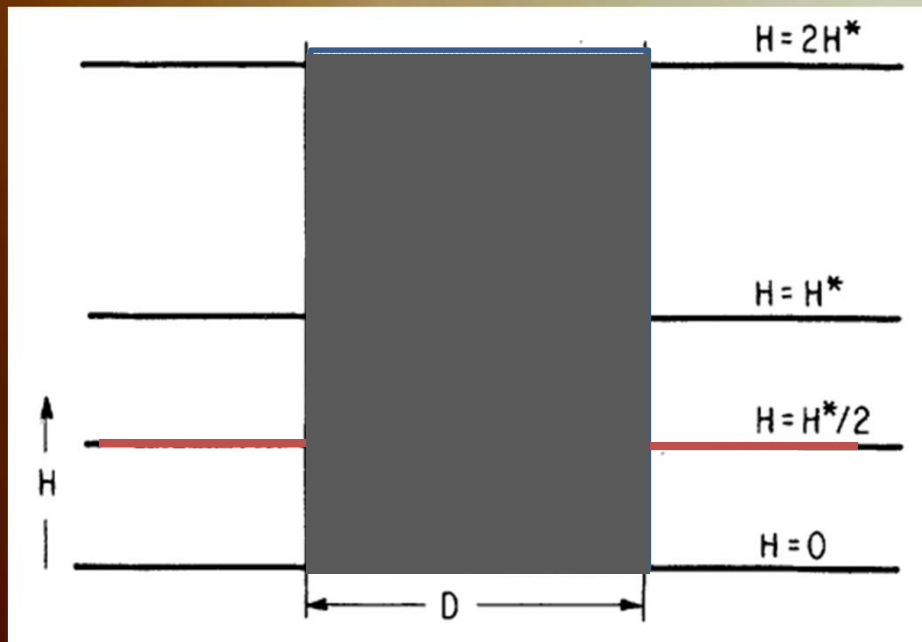


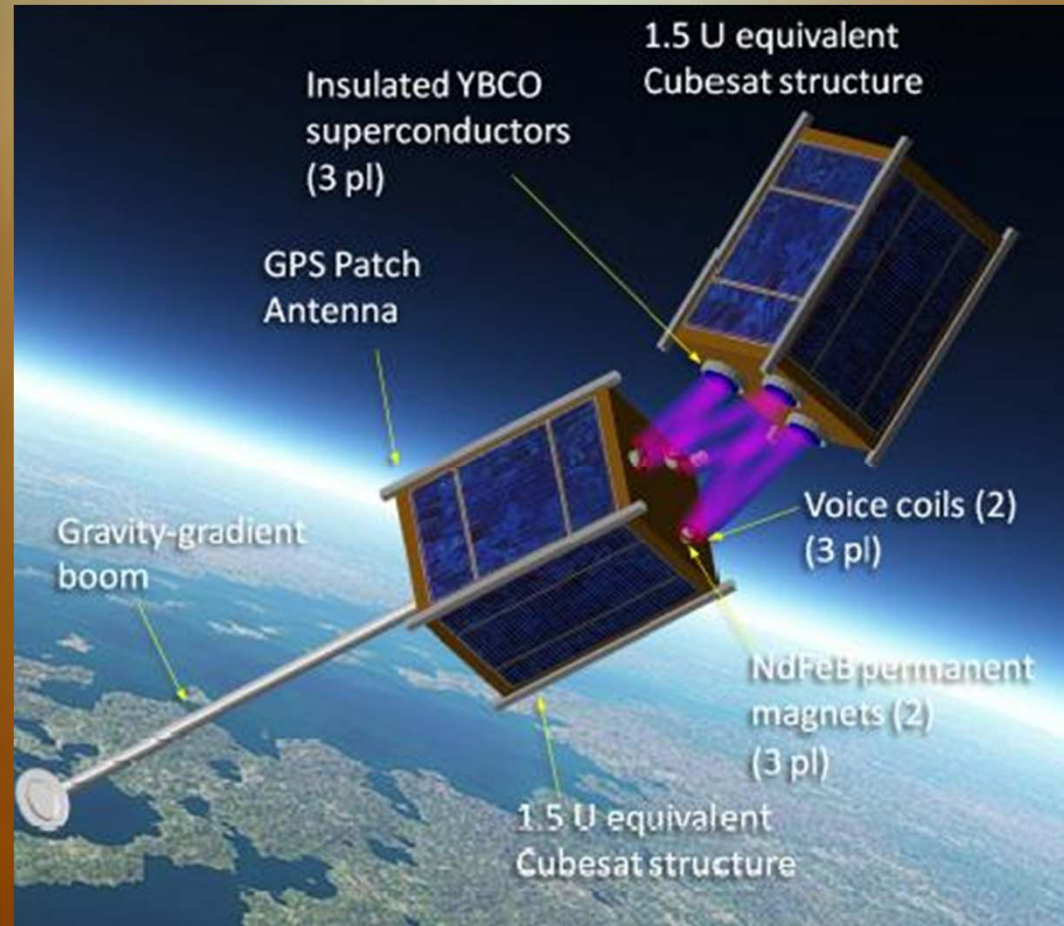
Fig. 4. Trapped field attenuation at $r = 3.5$ mm as a function of cycle. B_{TRAP} is the average of magnetic field in each cycle at the top surface of the bulk and B_{FC} is the magnetic field immediately after the field-cooling process. The plots are experimental results and the lines are numerical results.



Bean's Model



Cornell Application



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