KLAUS VOLKAMER

DISCOVERY OF SUBTLE MATTER

A SHORT INTRODUCTION

BROSOWSKI
PUBLISHING

Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet at http://dnb.dnb.de.

ISBN 978-3-946533-01-6

BROSOWSKI PUBLISHING

www.brosowski-publishing.com
e-mail: info@brosowski-publishing.com

Edited by Dr. Kenneth Walton, Fairfield IA, USA
Layout and cover design Sascha Krenzin, Berlin Germany
Printed in Germany

Printing supported by

wetsus

European Centre of Excellence for Sustainable Water Technology
8900 CC Leeuwarden, the Netherlands
www.wetsus.nl

Content

Preface

This booklet describes the discovery of a new form of matter called "subtle matter". The quantitative experimental work revealing the existence and characteristics of this form of matter are described in brief. This subtle matter is invisible to the eye but has weighable, macroscopic mass and has been found to interact with visible matter by two distinct modes. This discovery may have major implications for our understanding of the universe.

The findings summarized here reflect more than 30 years of research using state-of-the-art, automated, weighing technologies. The results are consistent with gravitational anomalies first reported over 100 years ago that were detected using manually operated balances and pointwise data recording, but those early findings were not followed-up systematically.

My scientific career started at the Universities of Munich and Freiburg, where I received a doctorate in physical chemistry. For the next 15 years, I was employed in a large chemical company in Germany, developing large-scale petrochemical plants that received international licensing. Even during these early times, and continuing to the present, I have tried to look beyond the borders of conventional science and technology. In these areas, as in all my research, the work is based on a solid foundation of experimental data obtained by scientifically accepted methods.

My strong dedication to the work described here stems from the feeling that something is missing in the present scientific understanding of the world. Our objective approach to explaining the universe, even though successful at dealing with matter on a practical level, missed, for example, a satisfactory explanation of human subjectivity and of life in general. The hope of modern science in the West has been to explain the phenomena of creation and of life in purely material terms, but this desire often appears to be at odds with Eastern approaches to the topic. From this conflict, the impetus arose in me to look for an extension of modern science, using its own approved methods, so that a sustainable bridge could be built between the Western objective sciences of matter and the Eastern traditional sciences of life.

I found a helpful door-opener for this undertaking in the study of ancient knowledge, where consciousness was described as almost an invisible "semi-fluid" form of matter. The hope emerged that this different kind of matter could be weighed.

Surprisingly, my first weighing tests, which were conducted in 1984 using a manually operated balance, a small geometrically-shaped detector, and a folded reference system, yielded significant gravitational anomalies. The mass of the detector appeared to change over time. If this change proved to be real, it would demonstrate a violation of the law of conservation of mass, one of the fundamental concepts of modern physics.

After more than 35 years of further research, the hypothesis was finally confirmed that the apparent violation of the law of conservation of mass was due to a previously unknown form of matter displaying both macroscopic mass and a field-like structure. It turned out that this invisible matter could be absorbed by special detectors that contain newly generated phase boundaries. In further experiments to be reported in another book, the quanta of this form of subtle matter, which can either increase (indicated by a positive sign) or decrease (indicated by a negative sign), the measured weight, were found to potentially illuminate the concepts of "cold dark matter (CDM)" and "cold energy" recently proposed by a number of physicists.

Furthermore, beyond its implications for modern physics, this new form of matter with its macroscopic mass appears to be a previously unknown, sustainable, source of energy, one that can be applied in technical processes without producing negative side-effects in the environment.

Dr. Klaus Volkamer, Frankenthal, 2015
e-mail: dr.volkamer@gmail.com

1 Subtle Matter

1.1 What is Subtle Matter?

Subtle matter, as we discuss in this booklet, is a previously unknown kind of field-like matter that appears to interact only weakly with electromagnetic fields, and is thus invisible to the eye, but possesses real, weighable macroscopic mass. It is not commonly experienced through any of our senses – touch, smell, hearing or eyesight – because of its field-like, spatially-extended structure. Only by the application of special detectors was it possible for this subtle matter to be scientifically recognized and characterized. Detected quanta of this subtle matter can exhibit either a positive or a negative mass, as weighing experiments reveal.

Except for the rare early reports discussed in this booklet, modern science has not been able to measure this type of matter previously and, therefore, has tended to deny the validity of the extensive research described here. Because of this skepticism, the possibility that the two detected forms of subtle matter, one indicated by a positive sign and one by a negative sign, might be candidates for the recently-posited, invisible "dark matter" and "dark energy" has attracted little attention. On the other hand, the existence of both the so-called dark matter and the so-called dark energy is inferred from astrophysical studies involving speculative extrapolations of the standard model of elementary, point-like particles, not from direct experiments [see CERN Courier, 56 (1), pp 21–22, 2016]. If those forms of invisible matter are real, then our experimental approach to studying subtle matter could offer a new direction from which to explore these phenomena.

In the case of subtle matter, direct tests performed with modern, automatic weighing technologies of high precision have revealed its mass and energy content. It is invisible and field-like, yet it can be absorbed by special detectors due to a form-specific interaction at phase boundaries. Furthermore, results appear to indicate that this subtle matter could be useful as a source of free energy on a large scale, without the limits of globally restricted resources and without damage to the environment or climate. This new form of matter also opens the door for a new understanding and explanation of a number of physical anomalies that have been known in science for a long time.

Finally, the detection of the various quanta of subtle matter (see section 2.6) has led to the formulation of extended concepts in physics that may offer a deeper scientific explanation of complementary medicine and even of life itself (see section 3).

1.1.1 Properties of Subtle Matter

As the high precision weighing tests show, subtle matter exhibits properties that are complementary to the properties of normal, point-like particles with sub-microscopic size that are known from particle physics.

Quanta of subtle matter have a field-like quality, i.e. extending spatially in the range of at least decimeters, with macroscopic mass, and with either positive (weight increasing) or negative (weight decreasing) signs, properties that are unknown in gross-particle physics. Subtle matter with negative sign ("$-m_P$-matter") seems analogous to the proposed "dark energy" in modern physics, while subtle matter with positive sign ("$+m_P$-matter") can explain the proposed "dark matter" in the Universe. Subtle matter exhibits memory-effects, due to its non-linear internal structure.

Results of experiments indicate that both forms of subtle matter can be absorbed by celestial bodies, yielding, on the one hand, significant gravitational anomalies on these bodies, and, on the other hand, anomalies for a global observer during alignments of celestial bodies such as during sun or moon eclipses. These studies indicate there is a cosmic background radiation of subtle matter with positive sign that exchanges momentum with gross-matter objects.

Another set of observations is interpreted to indicate that increased intensities of $+m_P$-matter weaken capillary forces, while increases of $-m_P$-matter strengthen capillary forces. Tests employing biological systems indicate that subtle matter with a positive sign has health damaging, i.e. “entropic” properties, while subtle matter with a negative sign supports health, thus exhibiting “negentropic” (or “syntropic”) properties.

The remarkable effects found with subtle matter may necessitate an extension of thermodynamics by adding a fourth law, i.e. a law of “negentropy” or “syntropy”, that can counteract the second law of thermodynamics, i.e. the law of increasing entropy in spontaneous processes of gross matter.

The experimental tests reveal that subtle matter has at least three physical interactions with gross matter and another one with itself:

1. Subtle matter is absorbed by gross matter systems at phase boundaries of gross matter materials. The efficiency of absorption is dependent on time and on the material and/or the geometrical shape of the gross-matter system. The result of this absorption is a measureable and signifi-

cant change of weight of the gross-matter material, as will be shown. Because of this shape-dependency of the absorption process, we term this interaction **"topological"** or **"form-specific".** Such an interaction was previously unknown in modern physics. As measuring effects during solar eclipses reveal, the plasma of the sun seems able to absorb subtle matter by the described topological interaction.

2. Due to its macroscopic mass content, subtle matter shows a **gravitational interaction,** with gross matter and with itself. Thus, by the topological interaction, subtle matter can be bound to detectors like those described below, and due to its gravitational interaction in the gravitational field of the earth, the observed gravitational anomalies of weight change result. As measuring effects during solar eclipses reveal, the sun and all universal gross-matter bodies carry subtle matter fields bound to the body by gravitational and/or topological interactions.

3. Subtle matter also appears to have a weakly expressed **electromagnetic interaction** with gross matter. However, the strength of this interaction is so weak that the human eye is not able to detect subtle matter.

4. As the theoretical description of subtle matter shows, subtle matter (and its quanta, which can also be termed **"field-quanta"** or **"space-quanta"**) can associate amongst each other under the effect of the so-called "Planck-force" ($F = 8 \cdot \pi \cdot c^4/G$). Thus field-quanta can associate to form clusters in the same way as atoms can form molecules. Studies included in a PhD-dissertation in the 20th century indicate that subtle matter exhibits no detectable magnetic interaction.

aries resulted in emission of subtle matter previously bound to these solid-state phase boundaries). With the manually available weighing technology of 1910, a measurement took 30 minutes or more (and with an accuracy of only ±30 to ±40 μg). Thus, the final proof of existence of this form of invisible matter with macroscopic mass was hardly possible at the time. Today, when real-time data recording over days or weeks is possible, with time intervals of seconds and with measurement reproducibilities of ±1 μg, we can have confidence in the observed deviations. The mass deviations verified today, which lead to violations of the law of conservation of mass and which were to some extent observed by Landolt and Heydweiller, cannot be explained by STR. We have, therefore, reached the conclusion that it may be necessary to extend the STR.

1.2 Experimental Methods

1.2.1 What are Phase Boundaries?

Phase boundaries exist at surface areas where density gradients occur, such as from solid to solid, from solid to liquid or to gas, or even within solid materials such as metals, minerals, or within water, where solid water clusters (which are small ice crystals within the water) exist in equilibrium with liquid water.

Newly created phase boundaries are ideally suited for the absorption of free forms of subtle matter that can be bound by a form-specific interaction with systems of normal matter. Therefore, the subsequent measurement of the mass of systems with newly created phase boundaries in comparison to reference systems without phase boundaries allows for the detection of invisible subtle matter, if both systems are in thermal equilibrium.

Such suitable phase boundaries can be realized in bench scale experiments, as shown by the detectors described below, in chemical, physical, biological or, for example, physico-chemical systems. If such phase boundaries are generated in a new way, then the time-dependent weight changes in the absorption steps that spontaneously follow can be detected in weighing experiments.

1.2.2 Equipment and Procedures

The balance in Fig. 1a, is a two-pan balance of the type Micro M25-D-V, from the company Sartorius AG, Germany. The total load per arm was 23 g, the reproducibility was ±1 µg or ±0.1 µg. The balance was mounted via a metal frame to a firm wall and was placed within a wooden box with a front-door for protection against external influences. The test and reference samples could be suspended to the balance by two stainless steel wires. In the picture, two environmentally-sealed, 50 ml, round-bottom flasks are seen. The left sample served as reference and contained no newly generated phase boundaries. The right flask was internally silver-plated prior to the test, and was thus prepared for a weighing experiment. Data recording was automatic, with data-storage on a PC.

The balance in Fig. 1b, a one-pan balance, was called Comparator Type C 1000, again from the company Sartorius AG. The total load was 1000 g, the reproducibility was ±2 µg. Four samples could be placed in a vertical position on a circular metallic weighing dish that lifted, turned and lowered the four samples by an electronically controlled mechanical gear so that they could be sequentially placed, one after the other, on a pin to be weighed. The data were printed. As with the former balance, the Comparator was placed on a metal frame, which was mounted to a firm wall and was protected against external influences by a wooden-box, with a front door in addition to the protective housing of the Comparator itself.

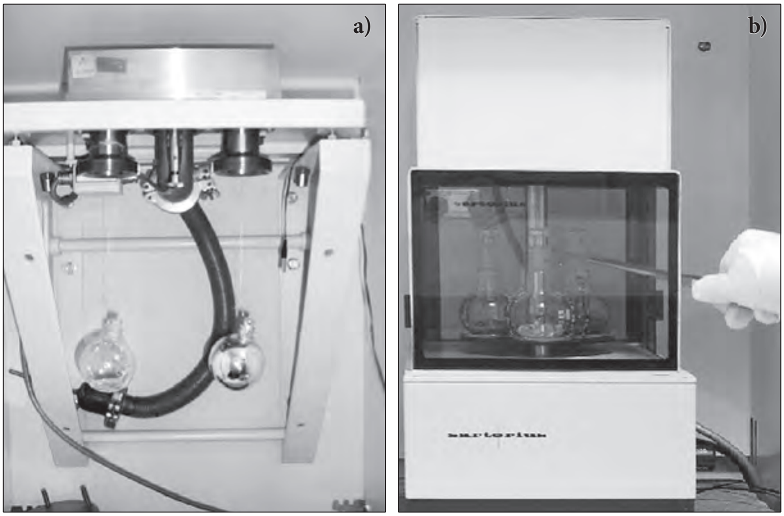

Fig. 1: a) Two pan balance, and b) Comparator used for the weighing tests

Four 50 ml gas-tight, standing, glass flasks were usually used in these tests. One flask, containing inert material such as glass balls, for example, served as the reference system, while in the other flasks newly generated phase boundaries (for example, generated by internal silver plating) served as the detectors for the absorption of subtle matter.

These weighing methods applying modern, high-precision, automatic balances served as the "door-opener" for the detection and characterization of invisible "subtle matter" (i.e. "fine matter") with real macroscopic mass. Even though manually operated mechanical balances with a precision of ±0.1 mg and total loads of up to 250 g or more could be used in similar experiments, it is preferable to use electronically operated, one-arm or two-arm balances, with total loads of about 25 g to 1 kg, working with a reproducibility of about ±0.1 to ±1 or ±2 µg. Such balances (see Fig. 2a, b and c) deliver weighing results in configurable time-intervals of seconds or minutes. By automatic data-transfer from the balance to a PC, the obtained data are recorded and subsequently stored on a mass storage device in the MB to GB range.

Software programs can then be used to yield a graphic display of the obtained measuring results.

Because such equipment has been available only for 15 to 20 years, it can be understood that the gravitational anomalies revealing the existence of subtle matter using bench scale experiments were not interpreted as such earlier.

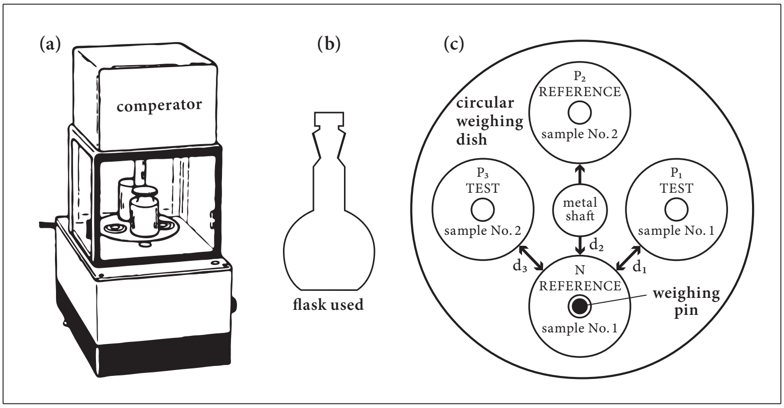

Fig. 2: Sketch of the Comparator, standing glass flask, and vertical view of the circular platform on which the glass flasks where placed

In addition to recording the mass differences at each measuring point, the atmospheric pressure, the temperature, and the relative humidity in the wooden box where the balance was placed also were measured and recorded, as were the date and time of measurement. The same measurement procedure and set-up was used for all balances performing the weighing experiments.

Finally, it is worth mentioning that the described method of experimentation fully incorporated the measuring concepts of modern physics, yet the gravitational anomalies obtained from the above described detectors of the bench scale-weighing tests step out of the borders of the present-day scientific paradigm, as we will see in the following.

1.2.3 Exact Scientific Research, no Artifact Influences

The measurement procedures for the weighing experiments were carefully planned to exclude artifact influences. First baseline experiments were done to exclude any known physical effects that might be responsible for artifact influences, thus allowing the effects to be analyzed purely in the realm of modern physics.

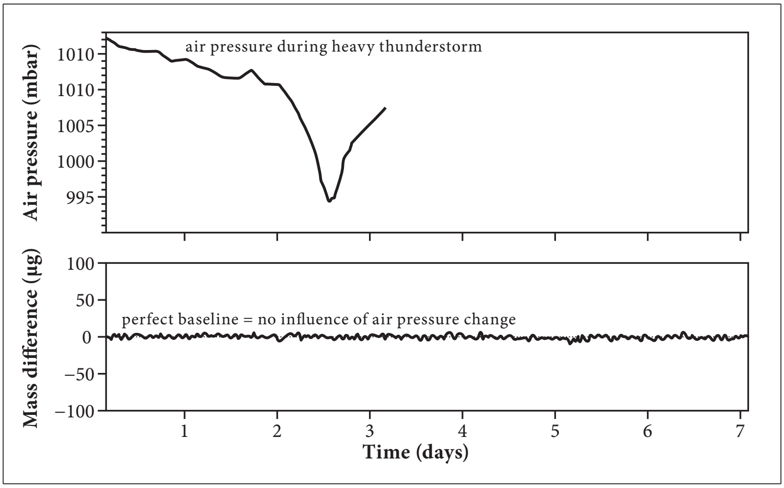

Fig. 3: No influence of air pressure during heavy thunderstorm

Here are some results from measuring cycles of a test using the Comparator (one-pan balance) with four empty, air-tight and closed test flasks (50 ml each) as “detectors” and “references”. Each measuring point indicates 20 minutes of weight measurements of the samples. The entire process lasted about 7 days. Two flasks were used as a “reference system” and two flasks served as a “test system”. By subtracting the initial mass difference between the test and the reference samples from all following mass differences obtained at the various measuring points, a straight horizontal baseline persisted over time. Even a passing thunderstorm, indicated in the graph by the significant drop of the measured air pressure, did not influence the baseline. This confirmed that the balance worked properly and was protected against outside atmospheric changes. The obtained result is in agreement with the expected conservation of mass in closed systems, as predicted in modern physics. This also confirmed the accurate working of the balance and of the weighing method in general.

As indicated earlier, an extensive research program was then undertaken to exclude any known physical effects that might be responsible for **artifact-influences**. This was necessary to allow us to explain any anomalous weight changes as true deviations from the laws of modern physics. It was shown that the following known physical effects could not generate the observed mass deviations:

- Electromagnetic effects (tests with discharging batteries in air-tight glass flasks);
- Influences of light or magnetic fields;
- Static or dynamic temperature effects;
- Variable atmospheric conditions, including buoyancy-effects;

– Pressure changes within a flask (tests with an internal pressure increase of up to 3 barg; see also Fig. 3: no influence of air-pressure change during thunderstorms;
– Varying rates of the absorption of water at the external surface of the test flasks (condensation);
– Time dependent maximum changes of Earth's acceleration;
– Maximum relativistic or quantum mechanical effects.

1.2.4 Types of Detectors for Subtle Matter

The following systems can be used for the detection of subtle matter.

1. Atmospherically sealed **chemical systems** using glass flasks that are freshly silver-plated internally (i.e. containing glass spheres, for example) can work as detectors in comparison to similar glass flasks without silver-plating. Besides silver, other metals can be applied after separation from aqueous solutions, for example, gold, copper and so on; so can precipitations from aqueous solutions of inorganic materials with internal crystalline structures, or colloidal systems. Also, liquid crystals can be applied in solid form (and may also be in a solution).

2. A purely **physico-chemical detector,** for example, sodium chloride (NaCl), dissolved in water (with variable concentrations, up to saturation) works well as a detector in gas-tight and closed glass flask or ampule, or similar polar compounds, which can be dissolved in water, may be used. Also, pure water absorbs subtle matter very well, especially after forming water-vortices (i.e. water-whirls; see section 3.3).

3. Purely **physical systems,** such as one or two layers of aluminum foil separated by polyethylene sheets and rolled together in the shape of a more or less perfect cylinder, for example with diameter of 2 to 3 cm and length of 15 to 20 cm (forming a cylindrical "roll-detector"), can be used. For a reference system, similar materials can be applied with the same isometric external dimensions, yet in different geometrical shape, e.g. the layers can be folded so that there is only a difference in the shape between the test and reference system. Besides aluminum, other thin foils of metals are applicable such as gold, silver, copper, etc. This implies, that the rate of absorption of subtle matter by normal gross matter depends significantly on the geometry of the gross matter used. The more symmetrical a gross detector is, the higher is the rate of absorption of subtle matter. This hypothesis was confirmed in many tests. Also, compact samples of various metals or alloys were successfully used as detectors.

4. **Biological systems,** such as cress seeds with some droplets of distilled water, can be used in thermodynamically closed systems such as gas-tight and closed glass flasks or sealed glass ampules in comparison to similar containers without such seeds. Other types of seeds such as mung beans, for example, can work as detectors, and certainly a great variety of other seeds of plants may be applicable.

2 Violation of the Law of Conversation of Mass

2.1 First Experiments

These subtle matter detectors with their specially induced phase boundaries, in combination with highly accurate balances and automatic PC-data recording, permitted experiments that led to unexpected and surprising outcomes. These have now been interpreted by formulating an extension of the concepts of modern day physics. Here we describe some of those experiments and their results.

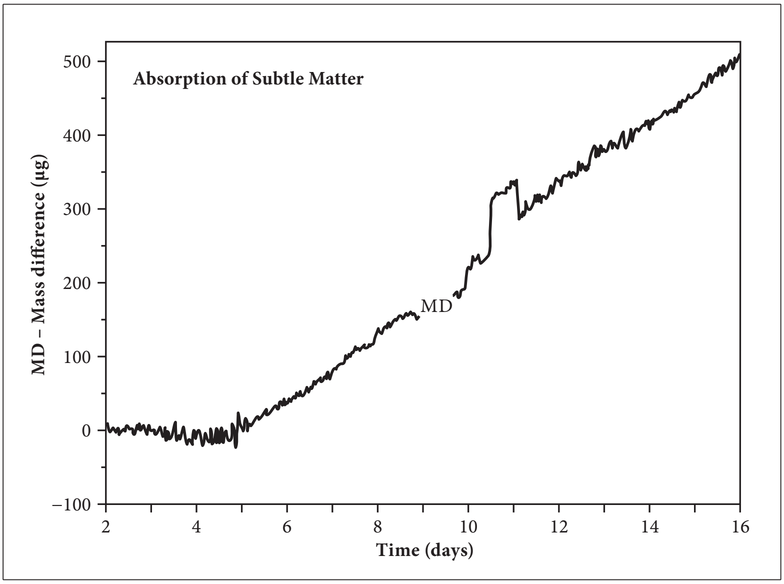

Fig. 4: Observation of apparent mass increase over a period of 11 days

Figure 4 depicts the measuring results comparing an empty reference flask with an internally silver-plated test flask (= detector), both gas-tight. The test was done under isothermal conditions within the protective wooden box in which the Comparator was placed, as in all other tests with the Comparator. Silver plating was done immediately prior to baseline testing.

The initial mass difference between the test flask and the reference samples was subtracted from each of the subsequent measurements. During the first days, no significant change occurred, apparently upholding the law of conservation of mass in the system. But afterwards, the mass of the silver-plated test flask systematically increased, over a period of 11 days, to values up to 500 μg, while the reproducibility of the balance was ±2 μg. As with some of the other tests, a range of negative mass variations was observed in the beginning of the mass deviations. The reason for this "start-up effect" is at present unknown. Clearly visible in the results are further "step-by step" mass changes in the time periods between days 4 and 5 as well as around day 11. These are the first hints for a **"quantization"** of subtle matter. The deviations from the baseline give credit to the hypothesis that a kind of invisible matter with macroscopic-mass was absorbed by the detector, presumably at the phase boundaries of the internal silver-plating. The internal silver-plating was done prior to the test (before starting the baseline measurement) by mixing aqueous solutions of glucose and Tollen's reagent (see https://en.wikipedia.org/wiki/Tollen reagent) which yields metallic silver according to the following chemical reaction:

$$\underset{\text{Glucose}}{C_6H_{12}O_6} + \underset{\text{Tollen's raegence}}{2\,[Ag(NH_3)_2]^+} + 2\,OH^- \rightarrow \underset{\text{silver}}{2\,Ag} + \underset{\text{gluconic acid}}{C_6H_{12}O_7} + \underset{\text{ammonia}}{4\,NH_3} + \underset{\text{water}}{H_2O}$$

A great number of additional tests confirmed the hypothesis that subtle matter can be absorbed at newly generated phase boundaries. These tests were done with a variety of different detectors (see above) as well as different weighing systems.

The results of the next test can be seen in Fig. 5. This test was slightly different in the way the new phase boundaries were introduced. In this trial, the aqueous glucose solution and the Tollen's reagent, were stored in separate compartments within the flask. In this trial, the test flask contained about 200 mg of finely ground (micrometer-sized) diamond dust to increase the internal surface with a chemically inert material. The glucose solution was placed in a separate glass tube, which was closed at the bottom. The glass tube was standing in an upright position in the test flask. Only the Tollen's reagent was put into the interior of the flask prior to atmospherically sealing it.

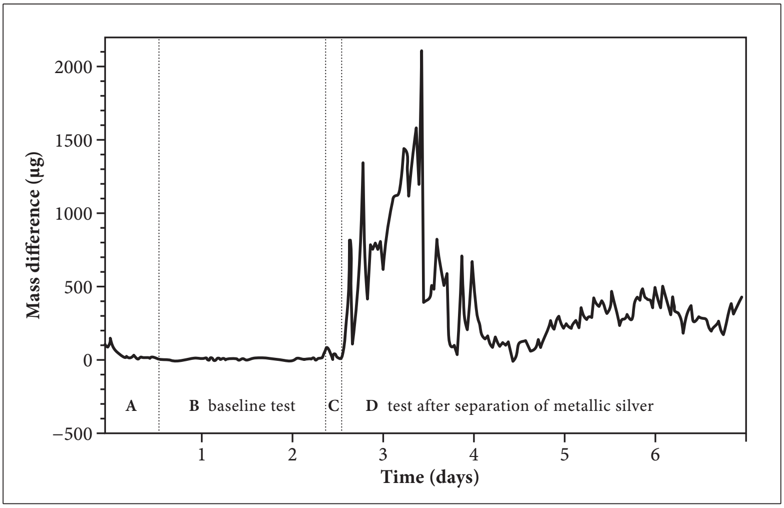

Fig. 5: Test with Tollen's reagent stored in separate compartments within the flask

Thus, prior to the test, a baseline could be run in the absence of the specially created phase borders. This baseline (period B) confirmed the law of conservation of mass, as predicted by physics. At position C, the test flask was taken out of the Comparator with a pair of tweezers and was slowly turned around, so that the aqueous glucose solution flowed out of the vertically standing glass pipe and mixed with the Tollen's solution in the flask to separate metallic silver. In this case, not only the interior of the glass flask was silver-plated but also the diamond dust within it. This significantly increased the internal surface area of the test flask.

This experiment was done to further check the hypothesis that the geometry of a detector significantly changes the rate of absorption of subtle matter by a form-specific interaction, cf. point 3 in section 1.2.4.

After waiting for some hours to reach thermal equilibrium once again, the actual test started and yielded the results depicted in period D. Now, it took not 3 days to see deviations from the law of conservation of mass but instead only a short period of time to see very significant mass changes. These started to occur abruptly and ranged in value up to about +2000 μg, detected with an accuracy of ±2 μg.

These results also give credence to the hypothesis that subtle matter will be spontaneously absorbed at newly generated phase boundaries of gross matter. Furthermore, these results suggest that the time needed for the absorption of subtle matter is reduced if a large enough phase boundary is available in a gross-matter system. But also, a second hypothesis may be supported, that is, that the absorption occurs due to a "topological", i.e. "form-specific" physical interaction between subtle matter and gross matter.

Another experiment confirming the hypothesis can be seen in Fig. 6. It shows first the results of a baseline (the lower line in each chart) with empty glass flasks, both closed gas-tight and weighed, under isothermal conditions, in time intervals of 60 s over several days. This reflected the conservation of mass of the two samples. This, again, is the expected behavior from present-day physics and also confirms that the balance was working accurately and that the applied weighing method is stable over several days.

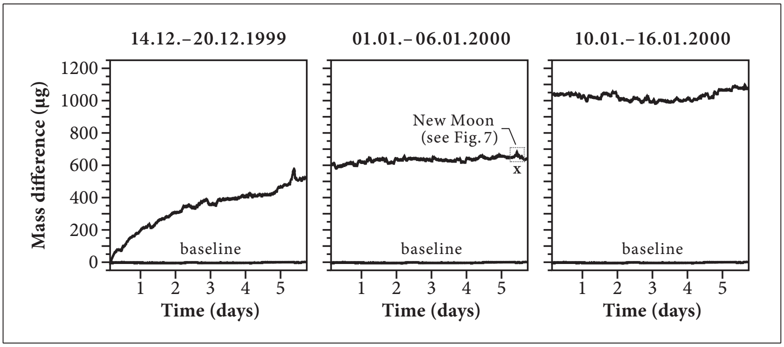

Fig. 6: One month experiment

The graphs in Fig. 6 depict the weighing results with an internally silver-plated glass flask as the test sample. In this case, the mass of the test flask increased over time, from its initial value up to the plateau values of about +1100 µg, over the test period of about 4 weeks. This implies a very significant violation of the law of conservation of mass. This result can be interpreted to indicate the continuous absorption of an invisible "factor", i.e. invisible subtle matter, with macroscopic mass, at the newly generated metallic phase boundaries.

2.2 Influence of the New Moon on Subtle Matter

The results of physical experiments are usually not dependent on the constellation of celestial bodies in the solar system. One exception is the well-known case of the lunar tidal forces on the oceans. However, during weighing experiments, significant mass changes were observed in the bench scale tests in relation to the relative positions of the Sun and the Moon. Such measuring results are shown in Fig. 7, which is an enlarged detail of Fig. 6, during the new moon phase of Jan. 6, 2000. The vertical lines in the lower graph indicate positions of background-stars behind the Moon in our Galaxy, and the height of the lines reflect the degree to which the stars are covered by the Moon. The sine curve indicates the height of the Moon during its passage from moon-rise to moon-set. The measured temperatures during the test period are also depicted in this graph, as well as the baseline-data (after adding 635 μg, so that they were included in the picture).

In comparison to this more or less horizontal baseline, the significant mass variations of Fig. 7 during the new moon period become obvious. The overall mass changes correlate with the rising and setting of the new moon. This overall effect in this test gives strong support to the interpretation that the internally silver-plated sample, when compared with the baseline obtained prior to the test, absorbed a form of invisible subtle matter emitted from the sun and the galactic background stars. Without this proposed explanation based on subtle matter, these weighable changes in macroscopic mass-content would reflect a direct violation of the law of conservation of mass.

Another interesting observation in this test is the correlation between the shape of the variation of the temperature profile and the shape of the background-star cover by the Moon. The most likely interpretation of this correlation is that the registered increased flux of subtle matter from these stars interacted weakly either with the electronic device used for the measurement of the temperatures or with the temperature itself.

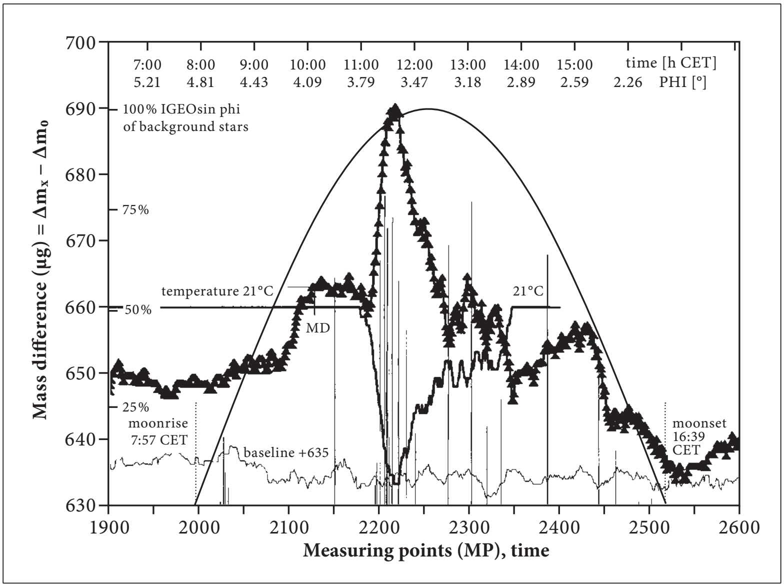

Fig. 7: Mass changes during the new moon period Jan. 06, 2000 (detail of Fig. 6)

Results of other tests indicating weak electromagnetic interaction of subtle matter with electronic devices of gross matter are presented in Fig. 8. Temperature measurements with thermocouples revealed that variations of the intensity of subtle matter fields may lead to measurable temperature changes. Such effects can be understood only if a weak interaction of subtle matter with normal gross matter exists.

Temperature changes were measured with thermocouples in the air, and the temperature data were automatically stored.