1 – Perception

Perception plays a central role in describing and explaining the multiverse. The sensory perception and its interpretation provide the basis for the resulting worldview.
According to the Ummites, the experienced universe (of humans) is not the real multiverse, but merely a distorted interpretation of it.
We have made a fundamental mistake in interpreting perception, which has led us to use abstract reductions, such as points and lines, as the basis of our world interpretation. To get this right, we must first deal with our perception.

1.1 - External stimulus

Everyone knows the SF film "Dark Star", in which three living and one frozen human beings cross the galaxy in a spaceship in order to use intelligent bombs to blow up unstable planets in any solar system. One of these bombs malfunctions and one of the pilots tries to make the explosive device understand that the order to use it was an externally induced false signal.
Eventually he can get the bomb to see that it has no way of testing to see if the deployment order is true or false.
We find ourselves in the same situation when it comes to our perception. We are not in a position to say whether what we directly perceive is actually there or whether it is only subjectively experienced. In everyday life we simply assume that what we perceive is the same as reality. Is this assumption permissible, or aren't we making it a bit too easy for ourselves here? Let's look at some examples from our everyday life.

1.1.1 - Example 1: Colours and warmth

When we see my colours, we are actually subject to an illusion. Outside of us there are only electromagnetic frequencies that have different wavelengths. The colours arise in us, due to our biology and psychology.
Heat is also an electromagnetic wave, just with a lower frequency. Nevertheless, we perceive heat very differently from colour, although both are the same form of energy. So, we perceive the same forms of energy with two completely different types of sensors. This also results in two completely different types of perception.

1.1.2 - Example 2: Electric light from fluorescent lamps

The electric light is operated with an AC voltage of 50 Hz. Since light does not have a charge polarity like AC voltage, it pulsates at twice the frequency, i.e. at 100 Hz. However, when experienced, a continuous flow of light is perceived.
What is experienced is the temporal average of the brightness. The perception and recognition apparatus has, so to speak, integrated the changing light values over a certain period of time. A calculated property is thus perceived that does not even exist as a physical quantity.
In an incandescent lamp, due to the inertia of the filament atoms, the intensity swing is not as pronounced, but it is just as present as in fluorescent lamps.

1.1.3 - Example 3: The television

A similar effect is encountered with television sets. The television produces 50 still images per second. Each individual image is built up line by line, which also requires a certain amount of time. In the experience area, however, a continuous film is perceived. One gets an indication that the process of perception and recognition is, so to speak, subject to an illusion when, for example, the wheels of a moving carriage appear to stand still or even turn backwards. Then it becomes clear that there is a stroboscopic process and not a continuous one.

1.1.4 - Example 4: Optical illusions

The very existence of optical illusions shows that perception and reality can be on two completely different levels. An everyday illusion is the apparent path of the sun, which is actually caused by the earth's movement around the sun.
At the time of Aristotle (i.e. he put it that way himself), it was believed that a force was needed to keep an object, e.g. a carriage, in motion. The conclusion was then: An object is at rest as long as no force is acting on it. This is apparently confirmed by our experience. Today we know: Frictional forces neutralize the kinetic energy and so a moving object comes to rest if no force is acting on it.
Galileo's case tests first led to the concept of acceleration, then to Newton via Kepler's findings. Newton's first law states: A body moves at a constant speed as long as no force is acting on it.
Mechanics was born through Newton. Had Aristotle not been wrong, physics would have been possible 1000 years earlier.

1.1.5 - Example 5: The physical field concept

Let us now look at another example from the natural sciences, namely the field concept as it is used in physics and electrical engineering. Let's imagine two electric charges. One charge **Q** in a fixed place, the other charge **q** mobile. Depending on the distance, forces act on both charges that can be described by Coulomb's law.

$$F = k \cdot \frac{Q \cdot q}{r^2}$$

The force **F** is proportional to the strength of the charges and inversely proportional to the square of the distance. **k** represents a constant of proportionality and can be ignored in further considerations. The moving charge is usually also referred to as a **test charge**.
The ratio of force per (sample) charge is defined as the field strength (in the area of the fixed charge).

$$E = \frac{F}{q}$$

If the test charge is now allowed to approach zero (through a mathematical limit value process), then one finally obtains the electric field strength of the fixed charge for the point in space in which the test charge is located. Mathematically it looks like this.

$$E = \lim_{q \to 0} \frac{F}{q}$$

Now one only needs to assume that the definition obtained in this way applies to every point in space, even without a test charge, and one has the concept of the electric field strength for an electric charge in any point in front of you.
Due to this construction, field strength cannot be measured directly. The only thing that can be measured (and thus also experienced) is the effect of force on another charge. Seen in this way, field strength or the whole concept of field is a fairly abstract construction. This applies not only to the electric field, but also to the magnetic and gravitational fields.
The concept of the field is an auxiliary concept from which it cannot be said whether it really describes something that actually exists. The scientist only knows that his models only allow an approximate description of reality, i.e. only with approximate accuracy, which in most cases is also sufficient for the situation to be clarified.
Unless phenomena occur that can no longer be described in the conventional context. Working in the natural sciences then requires an expansion of the framework (by expanding individual premises of the basic model) or, in the most radical case, the revision of the previous model.

Since scientific models are ultimately mathematical models, Einstein's statement about mathematics still applies here:

"Insofar as the propositions of mathematics relate to reality, they are not certain, and insofar as they are certain they do not relate to reality."

Where is the connection to perception?

Well, we perceive things primarily because we have a sensor system. And for us, this sensor system has the same function as the test charge in physics. What we perceive are only stimuli to which our sensors react. We cannot say anything about the cause of the stimulus, i.e. what really exists out there. It eludes direct perception.
As already mentioned, the Greek philosopher Plato compared our experience with a person who is chained in a cave so that he cannot see the entrance. What is happening outside can only be seen as shadows cast on the cave walls.
Einstein's analogy of this situation is that of a person holding a pocket watch that cannot be opened. He hears the clock ticking, sees the hands moving, but he can only speculate about the mechanism of the movement. Assuming there is any mechanism behind it. It could also be something like an organism.

The question that arises here is: **What exactly is then perceived?**

To do this, the path from stimulus detection to experience must be examined more closely. It will thereby be possible to create a complete perception model, which will serve as the basis for all further considerations.

1.2 - Senses, organs of perception, sensors

Perception happens through the senses. The senses have organs of perception, also called sensory organs, and the organs of perception contain sensors as information receivers. So, sensors create the information foundation of perception.

1.2.1		**List of human senses**
1.2.1.1	sense	**see**
organs of perception	eyes	
sensors	rods 110-125 million - black and white vision cones 6.3-6.8 million - colour vision	
Density of sensors	160000 mm^2	
bandwidth	400 nm (violet) - 700 nm (red) wavelength	
1.2.1.2	sense	**hear**
organs of perception	ears	
sensors	eardrum	
bandwidth	20 Hz - 20000 Hz	
1.2.1.3	sense	**smell**
organs of perception	nose	
sensors	chemoreceptors	
sensor area	5 cm^2	
1.2.1.4	sense	**taste good**
organs of perception	tongue, palate	
sensors	2000 taste buds	
1.2.1.5	sense	**touch**
organs of perception	hands	
sensors	skin	
1.2.1.6	sense	**pressure, touch, vibration**
organs of perception	skin	
sensors		
1.2.1.7	sense	**temperature**
organs of perception	skin, thermoreceptors	
1.2.1.8	sense	**spatial orientation** (balance)
organs of perception	Ear	
sensors	in the ear	

1.3 - Sensor and stimulus capture

Sensors are the basis of the senses. But how do sensors work? In the following chapters, optical data acquisition and evaluation will be used as an example, which in practice represents one of the most important information channels of our perception.

As already mentioned, the organs of perception responsible for this are the eyes. The entirety of the perceived stimuli is referred to as light. However, the light that is perceived makes up only a small part of the electromagnetic spectrum. Due to the limited bandwidth of the sensors, the eyes act like selection windows in the entire spectrum.

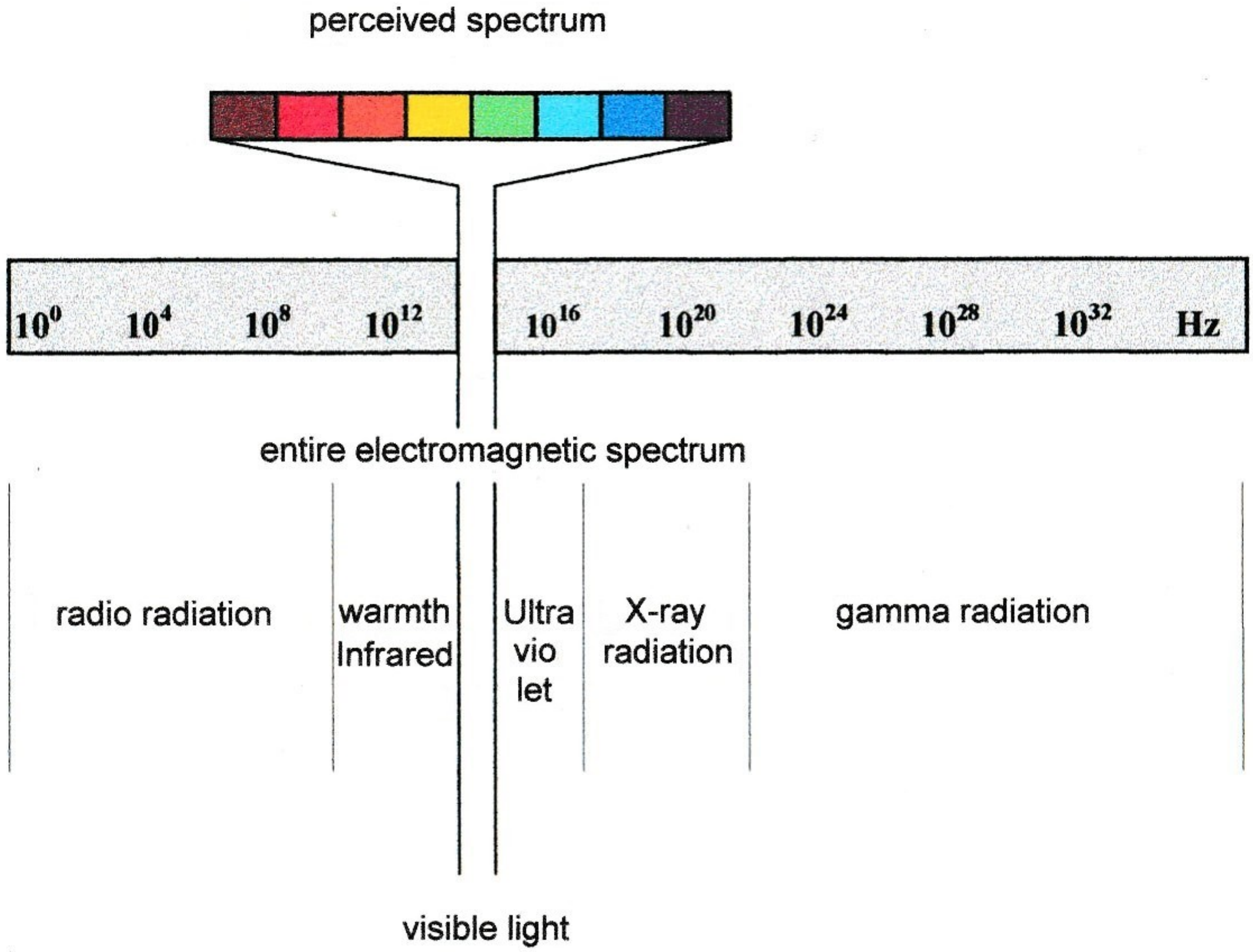

Figure 1.1 - visible and total electromagnetic spectrum

The actual elementary sensors in the eyes are called rods and cones. The cones are important for colour vision and there are about 6.3-6.8 million of them per eye. The number of rods is around 110-125 million and they are there for black and white recognition.
Biochemically, vision is based on chemical changes in visual purple. The rhodopsin of rods consists of the protein's opsin and retinin. Upon exposure to light, the opsin transitions from cis form to trans form. At the same time, the retinin complex breaks down into its components. This is what triggers the (electrical) potentials that are passed on as optical excitations.
All data coming in through these sensors is not sent directly to the brain, but passes through a three-layer network of synapses (in the eye) before reaching the respective optic nerve. The number of optic nerves fibers in each eye is around one million. But that can mean nothing other than that there is data compression here, which includes the ratio 1:100.

In addition, the data is no longer forwarded optically. The existing elementary sensors pass on their information in the form of electrochemical impulses or impulse sequences. A **data transformation** also takes place.

So, sensors do the following: They filter out a certain amount of external data and transform it into internal information signals. Strictly speaking, this process can be divided into two stages.

1.3.1 - Signal acquisition

The external signal is translated into an internal sensor state. This takes place in the actual elementary sensor, also called the **measuring sensor**. It is important that a reproducible external signal generates a reproducible internal sensor state. This guarantees verifiability and **quantizability**.

1.3.2 - Signal transformation

The elementary sensor state is transformed into a system-internal information signal via a transformation unit. The forming process, in turn, can consist of the following parts:

a) Transformation of the internal sensor state into a signal

b) Signal processing e.g. by filtering, inversion, integration

c) Signal pre-processing e.g. by compensation, levelling

d) Signal processing e.g. by digitization, pulse shaping

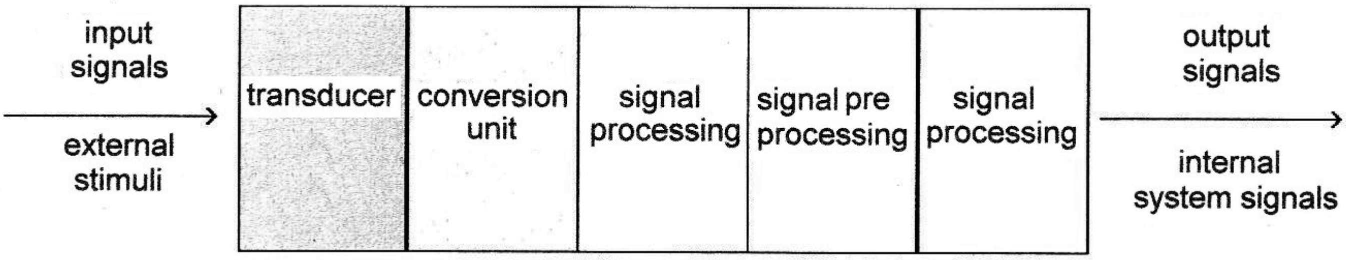

Figure 1.2 - physical structure of a sensor

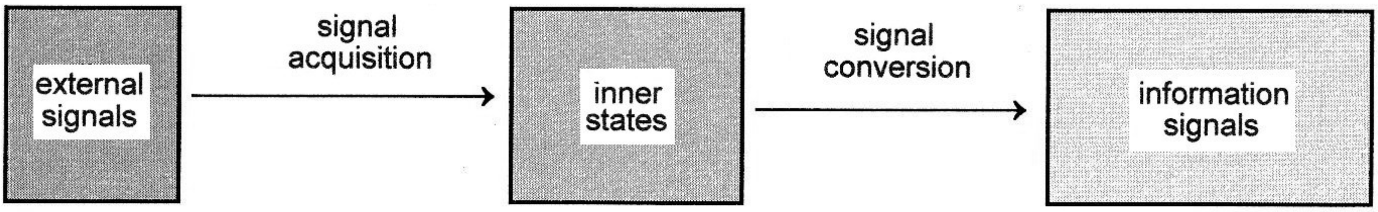

Figure 1.3 - Block diagram of the functions of a sensor

Overall, a sensor converts external stimuli into internal states, which in turn are transformed into information signals and are available to the entire system as an information basis.

1.4 - Stimulus detection

Sensor systems, regardless of whether they are natural or technical, can be described in terms of their function by the associated internal state sets. Since the internal states are caused by external stimuli, the sets of states represent the maximum detection spaces of a sensor system.

Mathematically, this relationship can be described as a mapping (function). Each element of one set is assigned an element of another set. In this case an internal state z of a sensor **ñ** is assigned to an external stimulus r_a.

The external stimulus causes the internal condition. However, since not all external stimuli are converted into internal sensor states, consideration must be restricted to a certain subset of external stimuli. Namely on the amount of **registered external stimuli** (signals). So, the external signals that also generate internal elementary sensor states.

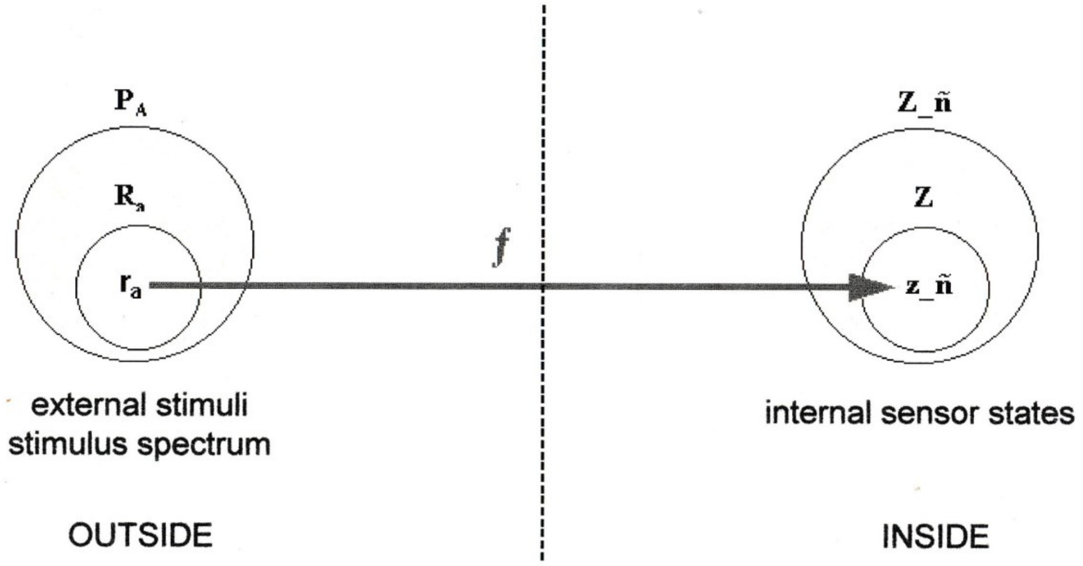

Figure 1.4 - Stimulus capture function f of a sensor ñ

1.5 - Signal transformation

The next stage in signal processing is the transformation of the internal states **z** of the elementary sensor **ñ** into a signal **s**, which can serve as a source for any informants. The transformation takes place in the transformation unit **ú**. The concept of mapping can also be used here. In this case, an externally emitted information signal **s** is assigned to an internal sensor state **z**.

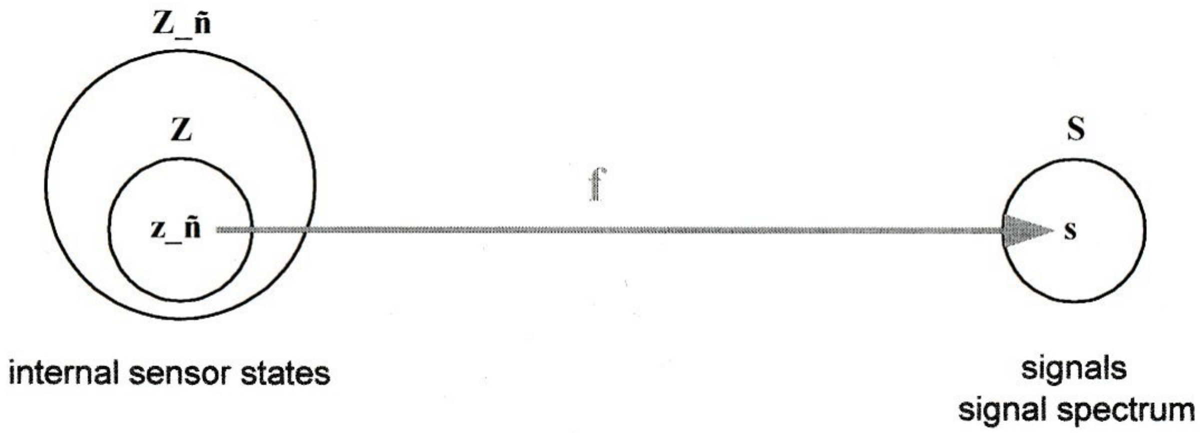

Figure 1.5 - State transformation function f of a transformation unit ú

1.6 - Stimulus transmission

If we stand outside at night and look at the stars, we now know that what we see there does not represent the present. The light from the stars sometimes takes years or (depending on the distance) hundreds or even thousands of years to reach us. Even the (originating from the sun) and reflected light of the moon takes about a second to travel from the moon to the earth. And during the day when we see the sun, this picture is about 8 minutes old. So, we perceive something of the past.

As a rule, however, we are not aware that exactly this process is constantly repeated in our nerve tracts
Every physical process, i.e. every energy transport or every energy-laden information transport in this universe takes time. The sensor data that is sent out is not received directly in the brain, but takes a certain amount of time to reach its destination. It's a span of a few hundredths of a second at most, which we don't even notice.

Only when we are confronted with processes that run much faster do we also experience the limits, e.g. in traffic accidents. We then call this moment of shock. This is the recognition time, which therefore makes up part of the reaction time.

In terms of control technology, this is the **dead time** of a system, i.e. the time in which the system cannot act with regard to an external stimulus. In order to make reactions faster, nature created reflexes. However, this only affects certain sensor signals. Everything that is important for central evaluation must be sent to the brain.

In addition, due to the sequential transmission of the electrochemical impulse sequences, our nerve tracts only have a certain channel capacity. If the limits are exceeded here, we call this sensory overload.
Based on the models of traffic theory (a branch of computer science), the following can be said: stimulus transmission is a temporal process that is associated with a certain maximum transmission capacity, i.e. the inner guiding states that finally reach our brain are different from those sent out (by the sensors) Data delayed.

Strictly speaking, the leading states that come from the sensors of the organs of perception form only a subset of the entire set of leading states occurring in front of the brain.
There is still information about the internal state of the organism, i.e. about organs, limbs, body condition.

Two types of sensors can be determined in this way, the **peripheral** sensors, which are responsible for external perception, and the **internal** sensors, which are part of body perception.

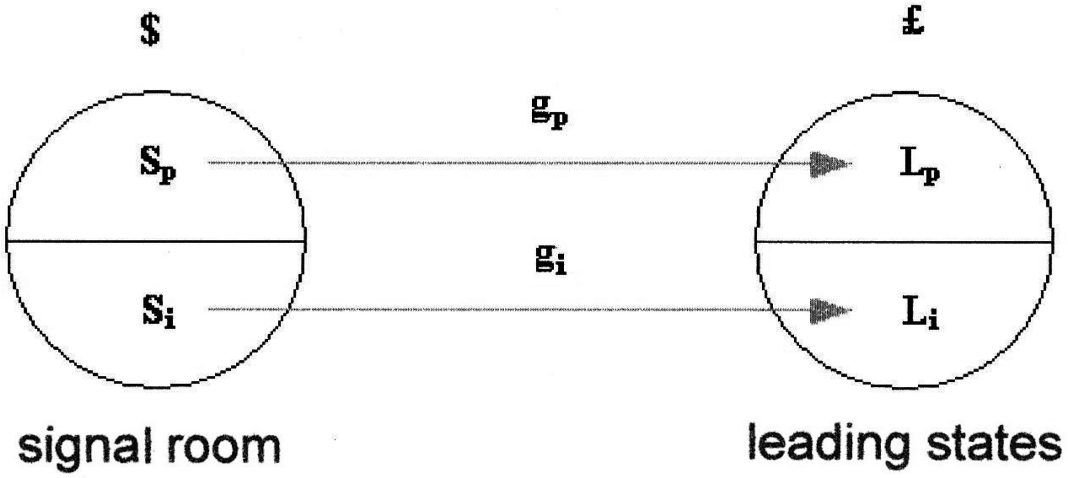

Figure 1.6 - peripheral forwarding function g_p and inner forwarding function g_i

1.7 - Storage and evaluation

From the research work that has been carried out over the last few decades, mainly in the field of neurophysiology, we know that the data supplied by our sensors is not experienced directly, but is first stored and pre-processed in the brain.
Concerning our vision, it can be said that a large part of the incoming data is processed in the hypercolumns of the cortex. Although we also find traces of visual processing in other parts of the brain, it is important here to locate the place where an IMAGE of our environment is present. And that place happens to be the striped cortex in the back of our heads. Seeing and storage in the cortex can be represented as follows:

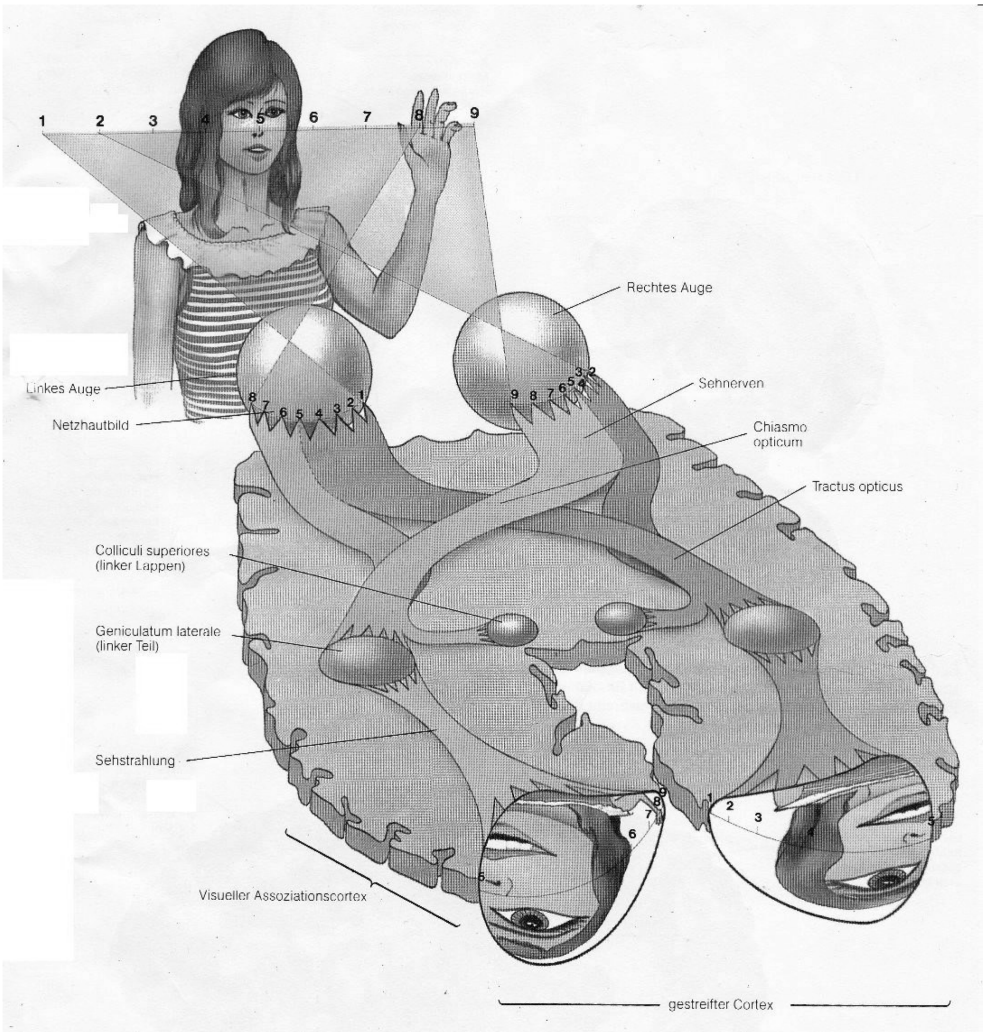

Figure 1.7.1 - Seeing and storage in the cortex

If you take a look at how our world is reflected in the brain, it is striking that the stored image is reversed, upside down and the proportions are distorted.

In addition, we do not get a uniform picture. Most of the information from each eye is stored in separate locations.

This inner canvas is therefore not an identical (1to1) representation of our world of experience, but rather a topological representation.

Here, too, the intermediate storage could be understood as a mathematical representation, whereby it must be taken into account that the information stored overall is much more comprehensive than the stored conductance values, i.e. the conductance values that come from the peripheral and internal sensors, and a certain amount of pre-processing has also taken place.

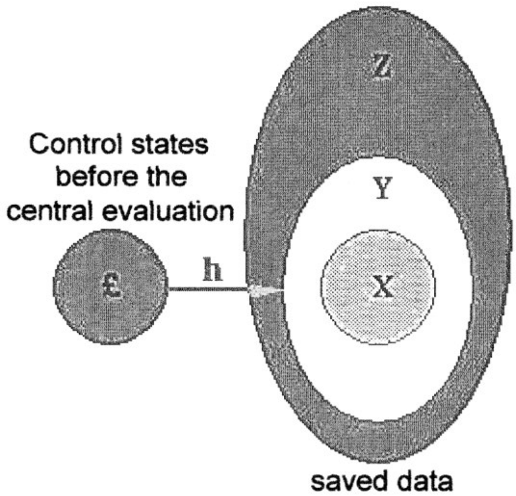

Figure 1.7.2 - General memory function h

1.8 - Experience

Up to this point, all the functions listed can be applied to technical systems as well as to living beings.
In technical systems, the stored data is processed further in the form of offsetting and comparison, but the system is not aware of this. It doesn't happen. While living beings distinguish themselves by the fact that they experience. yourself and the world.
So we can say that the perception of living beings is based on experience, while a technical system can only register, capture or detect.
So something like an experience component is added, which culminates in the human case, in an I-experience.
But what we ultimately experience, the image we get of our environment, has relatively little to do with the transport and storage of information, as we have seen so far. The inner canvas is anything but a 1 to 1 representation of our world. But that can only mean that what we have experienced represents a transformation of the processed data.

Especially since we know from our experience that the data experienced are accompanied by sensations, feelings and thoughts, i.e. are tinted, so to speak.
We can identify three types of influence:

1) physical influences (e.g. medication, drugs, trance)
2) emotional influences (e.g. stress, excitement)
3) mental influences (e.g. attitudes)

Another term for experiencing/experience is experienced/experience.

1.8.1 - Sensory perception

All mappings defined so far, from the sensory recording of external stimuli to the experience, can be summarized in the following way:

States **i** experienced by sensors are a function of the stored (sensor) data **x** (plus own contributions)

$$\mathbf{i = k(x)}$$

The stored data **x** is a function of the meridian states **l** arriving at the brain.

$$\mathbf{x = h(l)}$$

The states **l** arriving at the brain are a function of the signals **s** emitted by the sensors.

$$\mathbf{l = g(s)}$$

The signals **s** emitted by the sensors are a function of the internal sensor states **z_ñ**.

$$\mathbf{s = f(z\_ñ)}$$

The internal sensor states **z_ñ** are a function of the registered external stimuli $\mathbf{r_a}$.

$$\mathbf{z\_ñ} = \boldsymbol{f}(\mathbf{r_a})$$

In formal mathematical notation, the whole situation can be summarized as follows:

$$\mathbf{i = k(x) = k(h(l)) = k(h(g(s))) = k(h(g(f(z\_ñ)))) = k(h(g(f(}\boldsymbol{f}\mathbf{(r_a))))))}$$

Mathematically, we get a composition consisting of **5 functions**!

1.8.2 - Sensory perception function W

The five cascaded functions can be combined into a single function, namely the sensory perception function.

$$\mathbf{W = k \cdot h \cdot g \cdot f \cdot} \boldsymbol{f}$$

$$\mathbf{i = (k \cdot h \cdot g \cdot f \cdot} \boldsymbol{f}\mathbf{)(r_a) = W(r_a)}$$

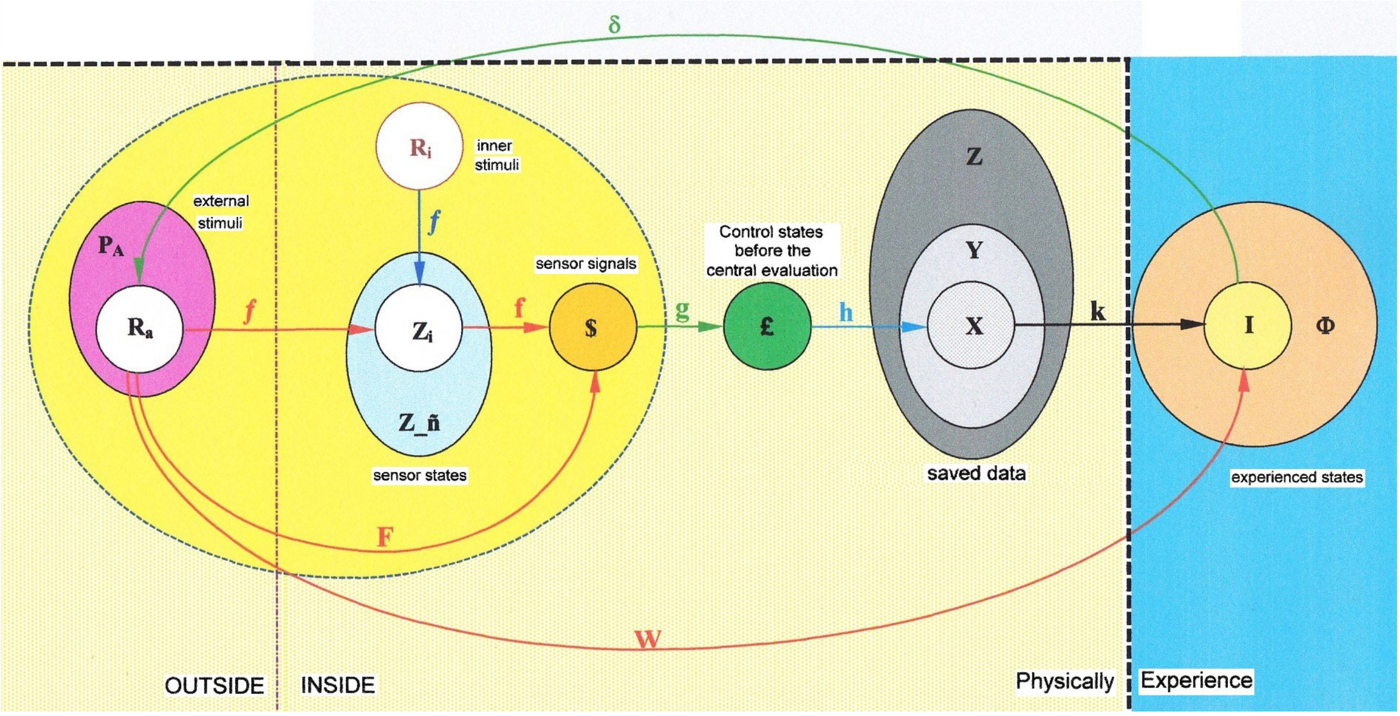

Figure 1.8 - Sensory experience

If we cannot experience reality directly and our world of experience is a virtual reality, how is it possible that we do not notice anything at first?
We know from experience that we perceive things as having the qualities we experience. In everyday life, we start from the following equation:

experienced environment = external reality

So, we assume that what we experience is an adequate reflection of our outer world. Our experience seems to support this attitude, since we know how to deal with our environment more or less well on a daily basis.

However, we have unconsciously created a function that maps experienced states back to the causative stimuli.
From a psychological point of view, this could be called projection.
From a more technical point of view, we have sort of installed a feedback function here.

1.8.3 - Sensory experience of the world

We do not experience our environment directly
additionally selected
then with a delay
and finally transformed.

Seen in this way, our external world of experience, i.e. our daily experienced world, is nothing more than a partial depiction of "reality".
The entire signal path of sensory perception acts like a filter on reality or the environment, so that in the end our external reality emerges.
For example, when we think of fluorescent lamps and television sets, or consider a phenomenon such as the apparent course of the sun around the earth, the term apparent is definitely appropriate for our experienced reality.
From an informational point of view, our world of experience could also be described as virtual reality.

Since we are ultimately not able to experience reality directly, we cannot make any statements about reality other than existence.
Plato's cave metaphor and Einstein's comparison of clocks are anything but purely philosophical material. Here we are confronted with a fundamental issue of existence.
External stimuli $\mathbf{r_a}$, which are mapped into experienced states $\mathbf{i}$ via the sensory perception function $\mathbf{W}$, are referred to as sensory perceived, with $\mathbf{i(t) = W(r_a)}$

1.8.4 - Definition: Reality

The set P_A that contains ALL external stimuli ra that can affect us is called **REALITY**.

Definition: Environment

The set r_a that contains all external stimuli that can affect us (at a certain point in time) is called **ENVIRONMENT**.

Definition: Physical environment

The set R_a that contains all external stimuli that could be sensed is called the **PHYSICAL ENVIRONMENT**.

Definition: own reality

The set **Φ**, which contains all experienced states, is called its **own REALITY**

Definition: external reality

The set I_A that contains the experienced states that arise through sensory perception is called **OUTER REALITY** with $I_A = W(R_a)$

Designation: the apparent

The external reality is also called the **APPARENT**.

We can view our entire perception as a selective filter that represents a part of what is happening outside in a time-delayed and transformative way.
The world we experience is ultimately nothing more than a virtual reality.
The assignment of the experienced states to the causative external stimuli is correlative. Assuming an identity is an assumption.
So, if you believe that perception reflects reality, you have not understood the difference between what appears and what is real.
You can also put it this way: if you think space is absolute and everyone in it has the same perception, then that is just a belief.

1.9 - Term Mapping

In sensory perception, external stimuli are transformed into experienced states. Inner sensor states, inner sensor signals, control states and stored data are operating states of an organism or the hardware of a technical system.
On the conceptual level, the sensory experienced states are assigned **properties**, such as warmth. The property always has a certain (perceived) **quality**, such as warmth at around 21 degrees Celsius.
A **property E** is called perceptible if it can be transformed into a **concep**t by an external stimulus via an experienced state using the concept assignment function

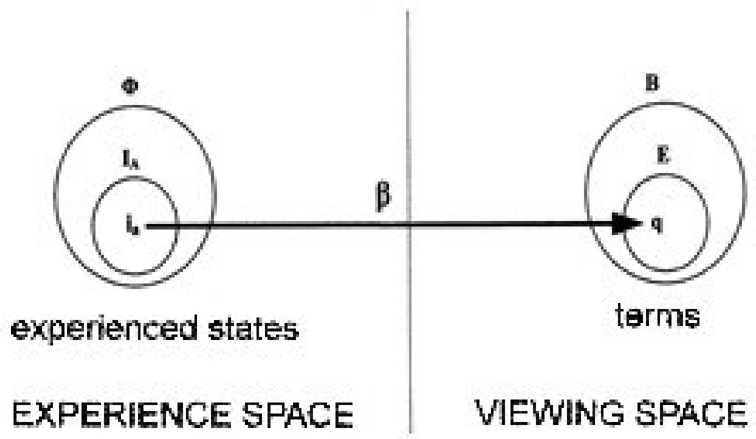

Figure 1.9.1 - Concept matching function β

Each property has a spectrum (amount) of qualities, with a quality representing the **smallest moment of perception** that can be experienced.

At the same time, we assign the recognized quality **q** (property **e**) to the causative external stimulus $\mathbf{r_a}$. So here a feedback from the properties or qualities to the stimuli is formed

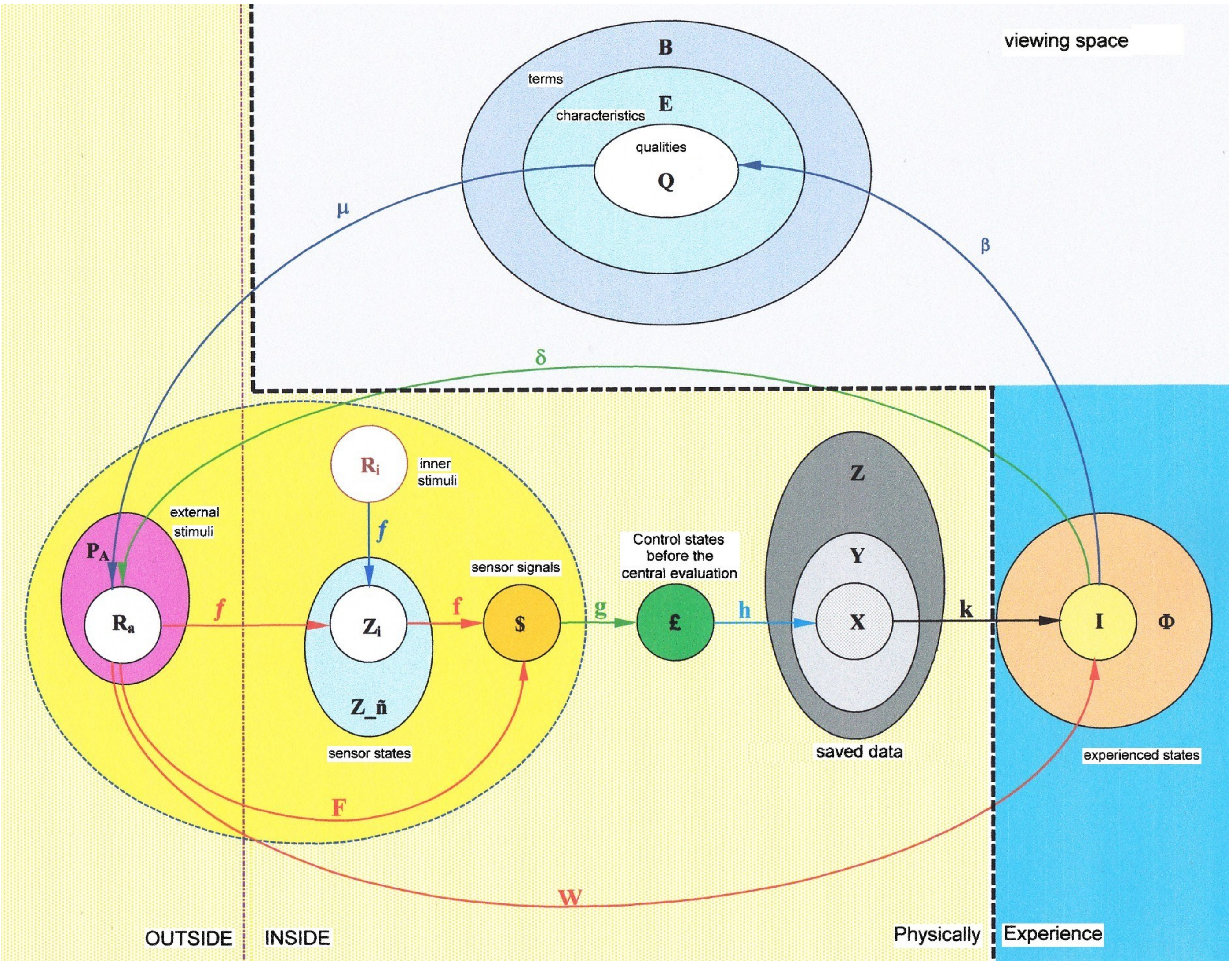

Figure 1.9.2 - Perception model

1.10 - Balance sheet: perception

So-called measurement spaces can be set up on the state spectra of the sensors. In this way, these can be continued through the further perception functions (and their bijectivity) up to the area of experience and also the level of observation. Two cases can be distinguished:

1.10.1 - Experience level

Experienced characteristics can usually only be reflected on a **rank scale**. An example is heat. The range of qualities here is: freezing, cold, lukewarm, warm, hot, scalding hot. A more differentiated view, in the form of a continuous scale, is not possible.

1.10.2 - External sensors

If you take external sensors, then according to the perception model only sensor transmission functions are connected before the perception path and thus form an **extension** of the entire human perception.
External sensors or measuring devices are usually designed in such a way that measured values can be read directly, i.e. they are registered via the optical perception path.

Strictly speaking, we also have a rank scale here, due to the **finite resolution** of the measuring device. However, this resolution is usually so fine that it is sufficient for metrological purposes and can therefore be mapped on a continuous scale.

Altogether, the measurement spaces of the sensors result in **rank scales on the experience level** and also on the **observation level**.
External measuring devices represent an extension and refinement of our perception.

A total of three levels can be identified that are involved in our perception:

Physical Level	sensors
Psychic Level	Experience
Mental Level	terms

We can view our entire perception as a selective filter that represents a **part** of what is happening outside in a time-delayed and transformative way.
Ultimately, the world we experience is nothing more than a virtual reality, or an interpretation of the signals received by the sensors.
The inverse assignment of the experienced states to the causative external stimuli is correlative. Assuming an identity is an assumption.

In order to perceive something (properties), a sensor is required

Each sensor is limited by its bandwidth.

The upper and lower limits of the range appear as qualitative polarities
⇨ Polarity formation as a result of limited perception, relativity of qualities

1.11 - The error in our interpretation

On page 67 of "Riss in der Matrix," Lilor says: The earthling is used to thinking about objects whose boundaries are given by lines and imagining angles given by lines and a plane and he is used to putting the objects in this or that place.
It takes a lot of effort from Earth humans to imagine a mathematical entity that cannot be represented by 3 coordinates defining a point in Euclidean space.

The Ummo letter **D59-2** states the following:
Terrestrial man envisions space as a "scalar continuum" in all directions. From this image of space, you (initiated by Euclid) worked out an entire geometry based on abstractions such as point, line and plane. <u>You have come to accept that point, line, and plane are in fact (although made with the help of an intellectual abstraction) the true constituent parts of the universe</u>.
This original error, which has not yet been corrected, costs you a significant delay in understanding the physical world.

1.11.1 - Points and intervals

The error in our worldview can be traced back to a misinterpretation of the smallest moment of perception, namely a quality.
Every measuring device has a finite resolution and so does every other sensor. As a result, one can only say that the measured value is within a resolution interval.
At this point we interpreted the interval as an **average value** and thus made a point event out of the whole, which we can then interpret as a continuous variable and from this we have generated continuous lines.
We have embedded the physics in a mathematical point system which, strictly speaking, only represents an abstract mathematical interpretation which can now be corrected based on the Ummo material.

According to the Ummites, the universe of the senses is illusory and not the real universe.

The fact that perception takes place in intervals, i.e. is quantized, can be easily demonstrated optically. All you have to do is create a colour spectrum (digitally) and you will find that two colours only appear different next to each other if their wavelengths are a few nanometers apart. If a minimum interval is not reached, it is perceived as the same colour.
Our perception is made up of **intervals** and that has to be the building block on which everything else is built.
A distinction must be made between a theoretical mathematical space that works with points and continuous lines and a physical space that does not know points but works with intervals.
This means that a distinction must be made between **physical mathematics** and **theoretical mathematics**.

Lines, areas and spaces can be generated from intervals, all of which are quantized. An interval can be defined like this:

$$\Delta x = \{x | x_{min} < x < x_{max}\}$$

Read: Delta x equals the set of all x to which applies $x_{min} < x < x_{max}$

If you let the interval shrink down to $x_{min} = x_{ma}$, i.e. $x \rightarrow 0$, then you get $\Delta x = \emptyset$, i.e. the empty set and not zero. You get an **empty interval** and no point.

There are no points in a quantized space

Mathematically speaking, the interval Δx is an open set in terms of topology, i.e. the end points do not belong to the interval.

1.11.2 - Dimensions

In some circles there is always talk of objects or beings that are said to come from the 4th or 5th dimension. So there's the idea that dimensions are sort of planes of existence that you can come here from.
But that is not the case. Soberly, that is, from a mathematical point of view, the dimension of a system means the minimum set of independent variables that condition this system.

Dimension is therefore a relative term that is not filled until it is applied to a system. Then it is decided what is actually to be considered as a dimension with regard to the system.

Definition: **E is a perceptible or imaginary property**

Examples of perceptual properties are length, width, height, warmth, colors, brightness, sounds, smells and tastes, etc.
An example of an imaginary property is the "open set" in topology, which is an area without a boundary and something like that doesn't exist in the real world.

Definition: **Each property E has a set of quality intervals,
which can be represented as one-dimensional scalars**

If you map the intervals to mean values and specify the interval as the resolution, then the following can be formulated:

Examples: 1m±0,001m, 2m±0,001m, … 21°±0,001°C, 100°°±0,001°C

Definition: **The quality intervals are ordered**

The following applies: $a, b \in E \quad \Rightarrow \quad a < b$ or $b < a$

Definition: **A dimensional axis D means a property E,
their quality intervals as an ordered sequence
can be represented on one axis**

In Ummo letter **W1** (Tweet O6-65) the Ummites say: Our mathematical model of the tetra-triadic multi-verse (Waam-Waam) needs only 12 dimensions to express itself.
Our physical, functional model considers only 10 dimensions: the dimensional tripod that forms "time" (T) is reduced to a single axial dimension, around which the three other spatial tripods rotate.

W1 (Tweet O6-67): Every universe (waam), including our universe, except for two frontier universes, is expressed in 10 dimensions, not all of which are perceptible to humans (oemii).

Every dimensional trihedron (3-dimensional coordinate system) consists of three dimensions. You can think of each triple as a triangular-based pyramid whose edges are elastic and articulated in 9 degrees of freedom at each vertex, with one of the vertices also articulated about the T-axis.

Any combination of the possible orientations across the 9 free dimensions forms a waam (universe).