

The physics and electronics meaning of *vivartanam*

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Abstract

A modern scientific awareness of the famous *advaitic* expression *Brahma sat, jagat mithya, jivo brahmaiva na aparah* is presented. The one ness of *jiva* and *Brahman* are explained from modern science point of view. The terms *dristi*, *adhyasa*, *vivartanam*, *aham* and *idam* are understood in modern scientific terms and a scientific analysis is given.

Further, the forward (*purodhana*) and reverse (*tirodhana*) transformation of *maya* as *jiva*, *prapancham*, *jagat* and *viswam*, undergoing *vivartanam* is understood and explained using concepts from physics and electronics. The application of such an understanding to the field of bionics, the electro-chemical neural communication processes is discussed. The possible use of this insight to build software for modeling human cognition and language learning and communication processes is hinted.

Introduction:

Human knowing, perception, reasoning, intellectual abilities, understanding, experience etc., are mental processes in the organism human-being belonging to *homo sapiens* species with vertebrate, helping it to cognize. Naturally, human mental processes are biological involving physico-chemical energy transitions and transformations relating to brain and the nervous system. Proteins, which are made up of amino acids which are oriented in space as poly-peptides, are one of the chief macromolecules that take part in these cognitive processes. All this is the hard-ware part of human cognitive system and relates to physiological psychology discipline.

The soft-ware describing human mental functions is being developed in the modern scientific fields of artificial-intelligence. Human knowing (through sense organs and brain) and perception are being modeled by many philosophers and scientists. Also several branches of learning take modeling of human cognitive process as one of their subject matters. Epistemology, psychology, physiological psychology, neurology, artificial-intelligence contribute to the study of human cognitive processes in their own way.

The Upanishads are replete with many expressions which deal with human faculties and mental processes which can be used to understand and model human cognitive processes¹⁻¹⁴. Indian spiritual wisdom contained in the Upanishads, *Advaita siddhanta*, *Shad Darshanas* and similar texts is not necessarily theological but is also psychological and scientific (Table I). The Upanishads are traditionally commented on as theological texts¹. But Upanishads are also texts of science on human mind²⁻⁹. *Advaita* and *Dvaita* concepts can be successfully used to understand the theory of human mental processes³⁻⁵. *Atmajnana*, the *Upanishadic* wisdom when interpreted from psychology and modern science point of view, yields a mine of information about phases of mind, states of mind and functions of mind³⁻⁹. The physical structure of mind and a model and possible theory of human cognition and language learning and communication processes can be presented when the ideas from *Upanishadic* wisdom, *Advaita* thought and *Sabdabrahma* theory are clubbed^{6,7}. As a continuation to this approach, *vivartanam*, the chief idea of *Advaita* thought about generation of *maya* from *Atman* and transformation of *maya* to form *idam* consisting of *jiva*, *prapancham*, *jagat* etc., and their modern scientific implications are presented from physics and electronics view and understanding.

Vivartanam is the type of change that *maya* undergoes while *sristi* (creation of mental impressions) takes place, when *sristi* is in the awareness we are mentally functioning. When *sristi* is in the awareness a veil is formed on *dristi* and creates *adhyasa*. According to *Advaita* thought only two mental situations are available for humans in the awareness of the *Atman*. The situations are *nidra* or *sristi*. *Nidra* corresponds to the *sushupti* state of consciousness (Concept Diagram I). During this phase of mind, all mental functions cease to be in the awareness and *maya*, whose transformations these mental functions are, becomes *nirvishaya suddha vasana pravaham*. During this phase of mind *maya* does not bifurcate as *divyam (jnana sakti)* and *swaram (prana sakti)* as in *jagrat* and *swapna* conscious states and both sense and actions organs remain dormant and functionless³⁻⁵.

All human learning, knowing, communication, perception, reasoning, experience, understanding and a state transcending these mental functions are the combined and simultaneous operation of *Atman*, *maya*, *antahkaranas* (inner mental tools), *pancha pranas*, sense organs and action organs³⁻⁵. Mental functions take place as the inter-play of *advaita (vishranta dristi*-unoccupied awareness-pure consciousness) and *dvaita* (simultaneous presence of *antarmukha dristi*-awareness of within of the body and *bahirmukha dristi*-awareness of the without of the body). Sense organs are activated by the *antahkarana manas* and this forms the *baharmukha dristi*-awareness of the without of the body. During this awareness of mind *tanmatras* (object-energy forms) are sensed by sense organs by tuned *manas*. **Perception is a construct from the inputs through sense organs and manas. Manas** gives *dristi* or awareness of without and within of the body, concerning the sensing and sensed and created object-energy forms.

Advaita Siddhanta and *Sabdabrahma Siddhanta* of Indian grammarians are cases in point. Like *Vedanta Darsana*, *Sabdabrahma* Theory has *advaita* philosophy as its basis³⁻¹⁹. *Advaita* philosophy is an integrated psychology, which professes the sameness of the knower in both the self-conscious (*jivatma*) state and the **Witness** in the transcendent pure-conscious (*paramatma*) state with Being and Becoming in forward and reverse directions during the processes of Expression/Teaching and Knowing /Learning¹⁴. *Brahma sat jagat mithya jivo brahmaiva na aparah-* means **What is present always is Brahman and jagat (which is moving or transient) is adhyasa and mithya (unreal); jiva is Brahman Itself, not different or distinct or separate.**

In *Advaita* (No Two or non-dual) state human mind possesses consciousness only. As *Prajnanam*, *Atman* gives *Dristi* to observe, be aware of and be conscious of understanding, meanings and senses of cognitions and cognition created experiences. During *advaita* phase, no transformation of *maya*-no creation, transformation and functioning of *antahkaranas* (inner mental tools) takes place but the current of awareness is connected to sense organs and action organs which are ready to function but not in a functioning state. In *dvaita* (two or dual) state of mind human mind exists as consciousness and awareness. Upanishads call consciousness as *Aham* and awareness of *vasanas* and *prapancham* as *idam*. The awareness, the manifestation of human mental functions is transitory and exists or ceases to be depending on the phase of mind. Awareness is present in *Jagrat* (Wakeful) and *Swapna* (dream) conscious states or phases of mind. In *Jagrat Sushupti* (Wakeful Sleep) or *Sushupti* (Deep Sleep) consciousness states or phases of mind awareness of mind as being intelligent to mental operations and doing mental functions will be absorbed in pure consciousness. In Wakeful Sleep conscious state awareness will be always on and mind functions if willed¹⁻⁷. We, humans learn, know, communicate, teach, perceive, think, experience, understand etc., when an interplay of wakeful, dream conscious states happen simultaneously making use of dual (*dvaita*) and non-dual (*advaita*) conscious states during which time *maya*, the reflected chit energy transforms reversibly to facilitate us to perform mental tasks. This two-way- forward and reverse transformation of *maya*- is technically known as *vivartanam* in *advaita* thought. In dual (*dvaita*) state of mind, sense organs and action organs are active and function forming mental operations and thus enable us to perform all mental functions with the help of inner mental tools (*antahkaranas--manas, buddhi, chittam and ahamkaram*) which are two-way transformations of *maya*^{4,5}. The alternating and simultaneous rise and set of dual mental state and ever present non-dual consciousness give us cognizing, communicative and other mental abilities.

Most of present attempts aim at modeling machine cognition as an isolated process which is the result of sensing^{4,5}. But if human mental processes are observed, it becomes obvious that human perception is but an intermediary process which transfers sensing into sense (understanding/experience) and sense into expression. Human cognitive process can be stated sequentially as follows: (1) *sensing*: through sense organs (knowing), (2) *perception* (thinking, reasoning, decision making, etc.), (3) *understanding/experience*, (4) *purport*- meaningful experience or experienced meaning. Human mental process is generally held to be a combination and quick successive transformations of four modes i.e., I Speaker/Teacher: (a) Purport/Awareness (Meaningful Experience or Experienced Meaning) (b) Understanding/Experience (c) Perception/Thinking (d) Utterance /Expression II Knower/Listener/Learner: (a) Knowing (through sense organs) (b) Perception/Thinking (c) Understanding/Experience (d) Purport (Meaningful Experience/Experienced Meaning)/Awareness. Language is the chief communication tool in day-to-day transactions and also in learning, understanding and imparting various knowledges, disciplines and skills. This paper intends to show that the understanding of human cognitive processes could be improved if due attention were paid to relevant data of physics- energy and its transformations playing a vital role- and- more surprisingly and interestingly – to *Upanishadic* wisdom and *advaita* philosophy.

Atman can be compared to present-day electronic oscillator and can be considered as a bio-oscillator issuing out psychic energy pulses of period 10^{-1} sec.³⁻⁹ and thus relates to the field of bionics. *Atman* is construed to be the **Energy-Presence** which provides psychic or mental energy and mental time-space^{4,5}. The psychic energy pulses when reflected in the *Medha* become *maya*- the virtual chit energy; *chidabhasa*. *Maya* is also known as *pranavam*³⁻⁵.

Human mind functions in *Jagrat* (wakeful conscious state) and *Swapna* (dream conscious state) – termed as *dvaita* (Two – **aham- idam**) conscious states - using above mental tools and simultaneously uses these *Jagrat* and *Swapna* conscious states and alternates between *dvaita* and *advaita* No Two – **only Aham – Aham** - the *Jagrat Sushupti*- conscious state and aids humans to know, reason, do intellectual operations, understand, experience and be blissful, peaceful and silent⁵ (Concept Diagram I).

In the *dvaita* (**aham-idam**) conscious state a differentiated perception of knower and known exists while knowing/learning. Thus a triad (*triputi*) of knower-knowing-known exists and perceived. The perception of this triad is absent in *advaita* (**Aham-Aham**) conscious state; then perception of knower and known gets absorbed in knowing and only awareness of knowing in the form of meaningful experience / experienced meaning / understanding remains / results¹². In *advaita* state experience / understanding / sense (of a word) becomes cognitive energy-form by and in **Eternal Awareness Prajnanam**, transcending *dvaita* conscious state. *Advaita* conscious state is also the state of purport - *tatpara*, *tatparya*, *rasa* or *bhakti* state.

Bhakti defined as **swa swaroopaanusandhanam bhaktirityabhidhiyate or cheto vrittirupetya tisthati sadaa saa bhaitirityuchyate** is the normal or natural or ground –energy state of mind. This is the state of absence of mental functions - the two-way transformation of *maya* and *antahkaranas*¹¹. This is the state of *Atman* or *Brahman*. In this state the *chidaabhasa* or virtual chit -energy *maya* – does not transform into *antahkaranas* (no *vivartanam* takes place) and no *antahkarana parinama* (transformation of inner mental tools) takes place. This state is also known as *suddha sattava guna* state, which amounts to *nirguna* state. *Rajo guna* (*antahkarana* mode) or *Tamo guna* (*antahkarana* mode) cease to be (Concept Diagram I, II, and III). Transformation of *maya*, reverse transformation of *maya* and cessation of transformation *maya*-the *dvaita* and *advaita* conscious states respectively- taking place simultaneously, consecutively and alternately is the structure, form, function, state and essence of human cognitive processes.

Transformation of *maya* as *antahkaranas* and *pancha pranas* and thence activating sense and action organs respectively and simultaneously (wakeful and dream phases of mind) is the *vibhakti* state or the state of ego- *jivatma* -state. All knowings /learnings /expressions /teachings take place in this *vibhakti* state making use of all mental tools in the awareness of *Atman*. *Sabdabrahma* Theory as proposed by **Patanjali** and developed by **Bhartruhari et al** takes this *advaita/dvaita* concept and a theory of language learning/teaching, speaking/understanding in the four modes of mind (*para*, *pasyanti*, *madhyama* and *vaikhari*) is developed using *sphota vada*, a consequence of *Sabdabrahma* Theory⁷⁻¹⁹.

In this theory the *advaita* state - *Jagrat Sushupti*- proposed by *Vedantins* corresponds to *para* mode of language communication process (Concept Diagram II). This is the *tatparya* (purport) or *rasa* (experienced meaning) state. This *tatparya* state is a state of awareness of experience of meanings. And in this awareness the untransformed *maya* is the flow of *suddha vasanas*. *Pasyanti* mode of language is the state of senses (of words/sentences) or *artha sthiti* or state of verb. The verb will be in a **present continuous** or **infinite** form without subject and object.

When an object energy-form. the *tanmatra* (Concept diagrams I and II) – a *vishaya*- is sensed through *antahkaranas*, this verb state becomes a state of sentence – *bhava* or thought. This state is known as *madhyama* mode of language -the *vibhakti* state of sentence or thought and is the modulated

chidabhasa (undergone *vivartanam*) (Concept Diagrams II and III). This modulated energy- form gets transformed into sound energy through vocal chords' movement and is expressed /uttered. This is the *vaikhari* mode of language. All this happens in the speaker/teacher.

This uttered sound-energy (the *vaikhari* mode of language) is picked up by the ears (sense organs) of the listener/learner and becomes sentence in the *madhyama* mode- the modulated *chidabhasa* mode in conjugation with the *antahkaranas* (inner mental tools). This sentence-energy form in *madhyama* mode is in **subject-verb-object** (the triad-*triputi*) form. This mode of language gets demodulated (reverse transformation of *maya* - the *vivartanam* in the reverse direction) into meaning, resulting in understanding/experience in the *pasyanti* mode- to a verb (sense), in present continuous or infinite form, the subject and object being dissolved in the sense of uttered /expressed sound.. This, when meaningfully experienced in the awareness of *para* mode, is the purport or *rasa* or *tatparya* of the uttered word- Bliss, Being, Peace or Unoccupied Awareness , the normal or natural state of mind - *i.e.*, the state of Self, *Atman* or *Brahman*.

Thus *chit*-energy pulses, being issued out by *Atman (Sat-Chit-Ananda)* and after getting reflected in the *medha* as virtual or *chit*- energy (*chidabhasa* or *maya*) pulses , first get modulated from this *para / rasa / tatparya* state by cognizing stored energies in potential (*jada*) form–in the form of subject-object- free verbs/senses, experiences, intuitions, understandings, urges , volitions through the *antahkarna chittam* to be transformed in to the mode of *pasyanti*; then again gets transformed into subject-verb-object state, the *madhyama* mode - by simultaneously cognizing the object energy-forms –*vishayas*, stored as potential energy (*jada*) forms – as *idam, jagat* or *prapancham* through the *antahkarana, manas* in the awareness of within – *antarmukha dristi*- as *bhavas* or thoughts. Intellectual operations such as reasoning, decision making, take place in this awareness. When the *antahkarana, manas* is tuned to the object energy-forms (light-eye, sound-ear, chemical- tongue, nose and heat, mechanical-skin) through *jnanendriyas* – sense organs- then the awareness becomes *bahirmukha dristi*-awareness of without. This process and the reverse of this process, happen in human-beings while expressing/speaking or listening/learning- as transformation or reverse transformation respectively-together known as *vivartanam*- of *maya* and *antahkarnas* in conjugation with sense organs and action organs, *karmendriyas* (Concept Diagrams II and III).

This is the essence or gist of human cognitive process and language communication process as envisaged by the *Upanishads* and the *advaita* philosophy together with *Sabdmabrahma* Theory in terms of *vivartanam*. Thus this simple model of integrated psychology (the science of mind and mental functions) and language communication process when compared with the radio broadcasting and reception processes, depicts the gross energy-transforms' model (Concept diagram III) of human cognitive process. This model provides necessary soft-ware while constructing machines which can perform human mental tasks.

The following are relevant *Lalita Sahasra namams* which further aid and clarify present article and enhance the understanding:

Jagrat swapna sushupteenam sakshi bhootyai namah

Sarvaavasthaa vivarjitaai namah

Sarvoopadhi vinurmakta chantainayayai namah

Tatwamartha swaroopinyai namah

Punaraavritti rahita pura sthaai namah

Mithya jagadadhistaanaai namah

Sristi sthiti tiroodhaana sankalpaai namah

Satya jnaana ananda swaroopinyai namah

Ichha sakti jnaana sakti kriya sakti swaropaaai namah

Para pasyanti madhyama vaikhari swaroopinai namah

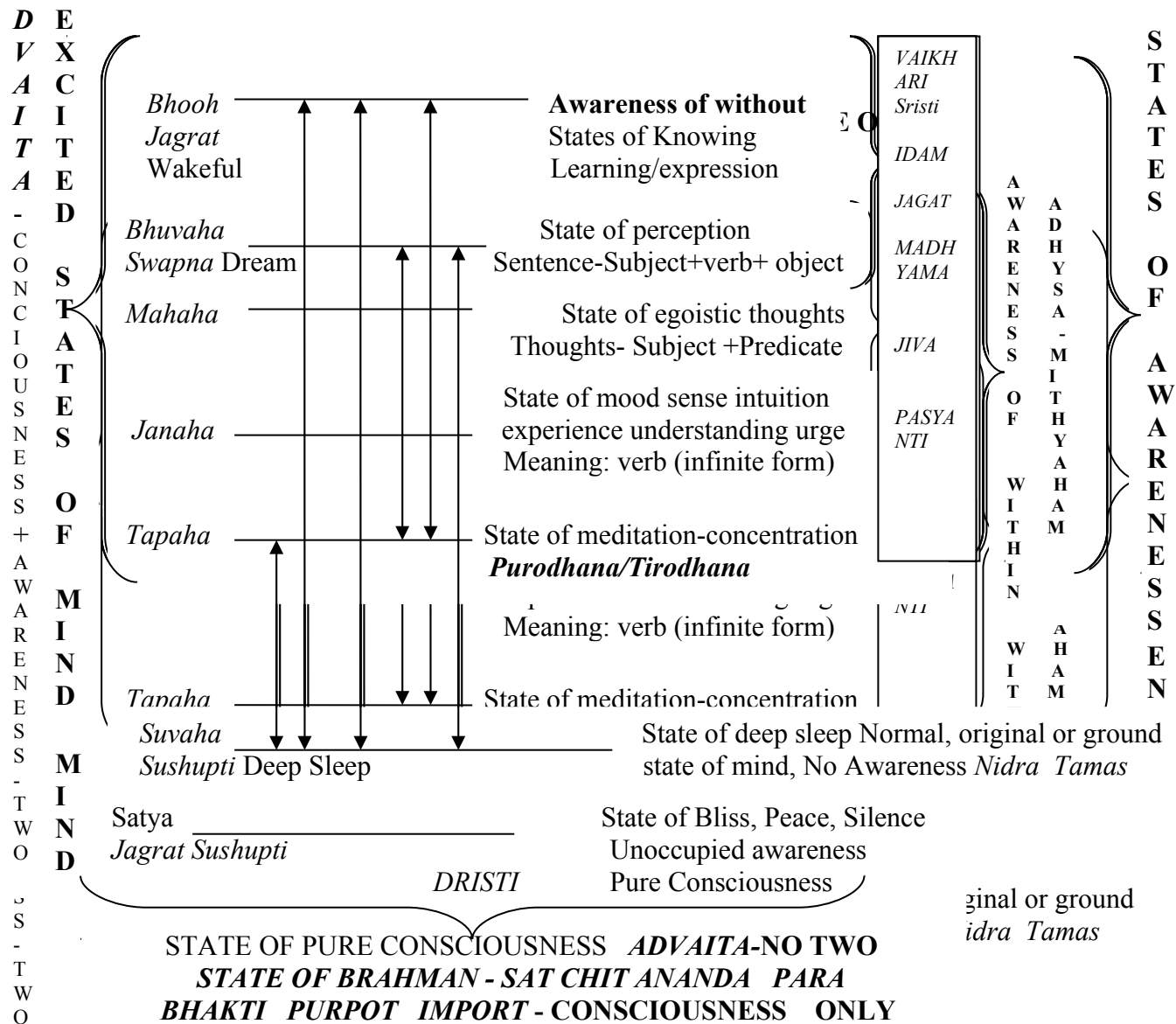
Namaroopa vivarjitaai namah

Table I

PSYCHOLOGICAL AND SCIENTIFIC MEANINGS OF CHIEF *UPANISHADIC MAHAVAKYAS*

1. ***Aham Brahma Asmi* I AM BRHMAN**
The real identity of 'I' is Unoccupied Awareness. 'I' is not a body, person, thought or not a sense. 'I' is pure consciousness.
'I' is the impersonal **Seer** which is the source of mental energy and guide of and witness to transformation of mental energy as mental functions but unaffected by them and transcending both mental functions and their cessation.
2. ***Tat Tvam Asi* THAT IS YOU**
Self and Pure Consciousnesses are same in nature, content, structure, form (function) and presence. At a given moment either self-consciousness or pure consciousness will be present. Self-consciousness is super imposition over pure consciousness. Pure consciousness is continuous, self-consciousness is transient and transitory.
3. ***Ayam Atma Brahma* THIS ATMAN IS BRAHMAN**
Atman is *Brahman* – Unoccupied Awareness — Energy Presence without transformation.
4. ***Prajnanam Brahma* PRAJNANAM IS BRAHMAN**
Brahman– as *Atman* — Energy Presence – is Mental Time- Space and Continuous Awareness.
Prajnanam is Unoccupied (by cognitions, thoughts, cognition-related and created experiences, senses or their retrieval) Awareness in Pure Consciousness.
- 5 ***Raso vy Saha* AWARENESS OF EXPERIENCE/EXPERIENCE OF MEANING IS BRAHMAN**
Experience of Essence of the meanings of all *vakyas* (sentences) - All Cognition-related experiences in the awareness of the *Atman*- Meaningful Experience. Silence. Peace. Bliss. Experienced meaning. Purport. Import
6. ***Anando Brahma* BLISS IS BRAHMAN**
Unoccupied Awareness is bliss.
7. ***Sarvam Khalu Idam Brahma* ALL IDAM IS BRAHMAN**
Idam, (*prapancham* or *jagat*) (all the world - the collection of cognitions sensed by sense organs through the medium of *manas*) – is composed in, made up of, sustained by, rests in and ceases to be because of and part and parcel of psychic energy pulse generator – *Atman*.

CONCEPT DIAGRAM I: PHYSICAL STRUCTURE OF MIND

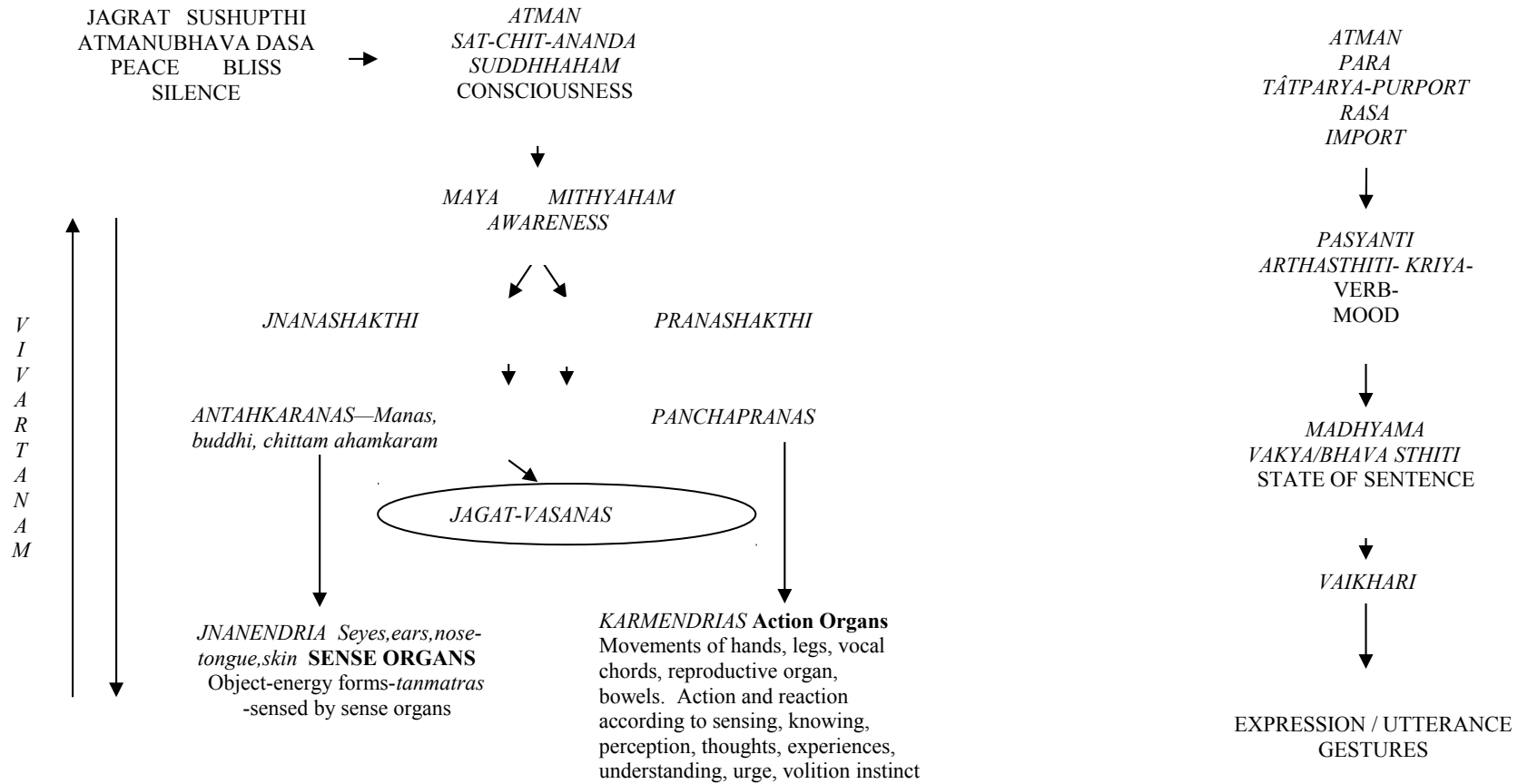


CONCEPT DIAGRAM II

ADVAITA PHILOSOPHY

VEDANTA AWARENESS

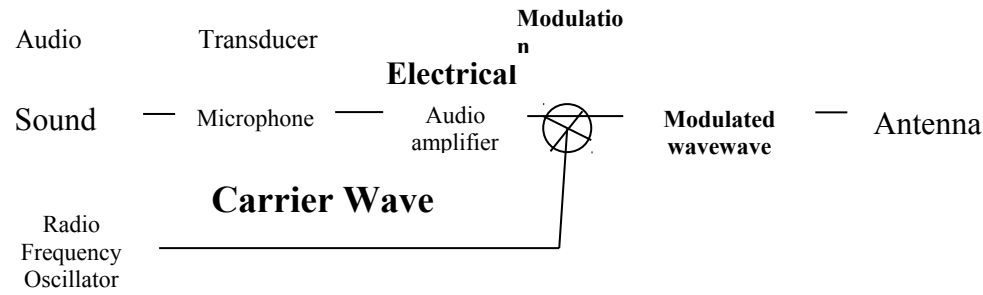
SABDABRAHMA THEORY AWARENESS



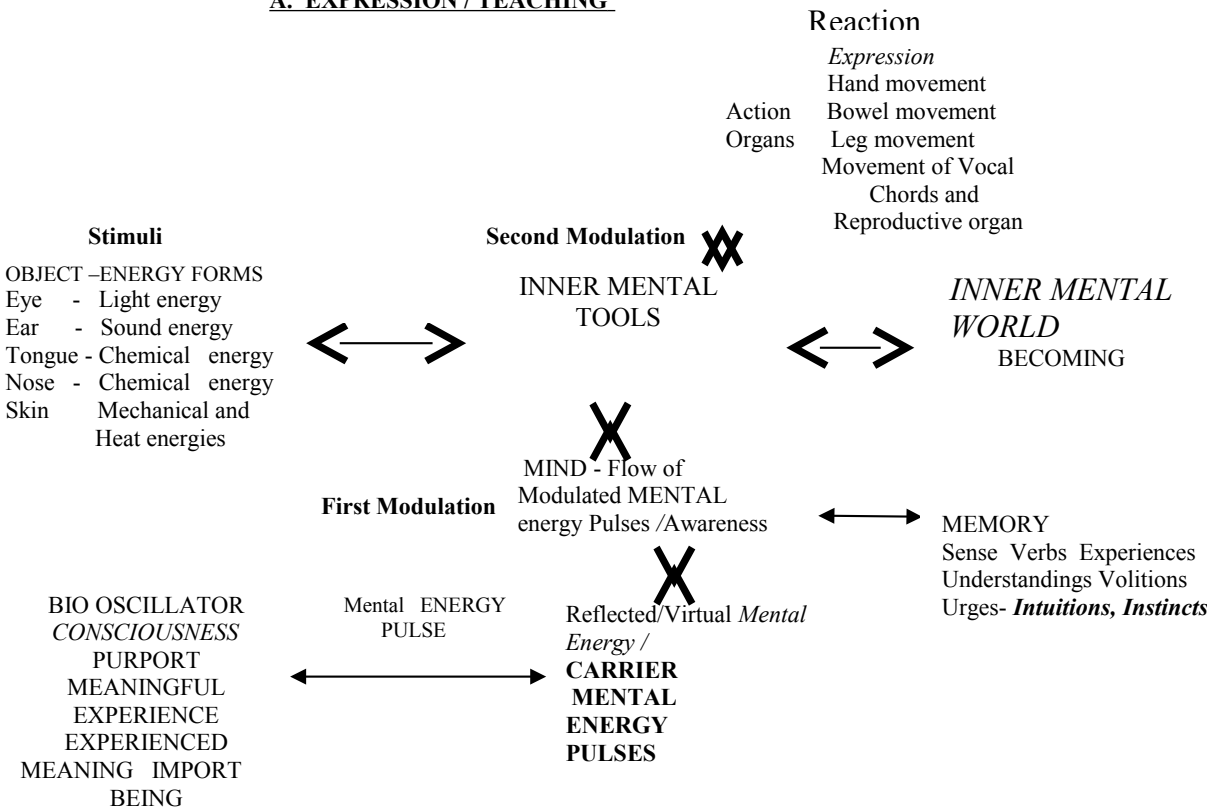
CONCEPT DIAGRAM III

COMPARISION OF RADIO WAVE BROADCASTING AND RECEPTION WITH HUMAN KNOWING/ PERCEPTION/ EXPERIENCE/ UNDERSTANDING PROCESS

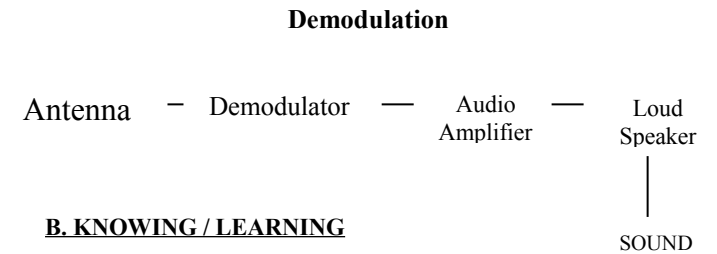
a. Transmission



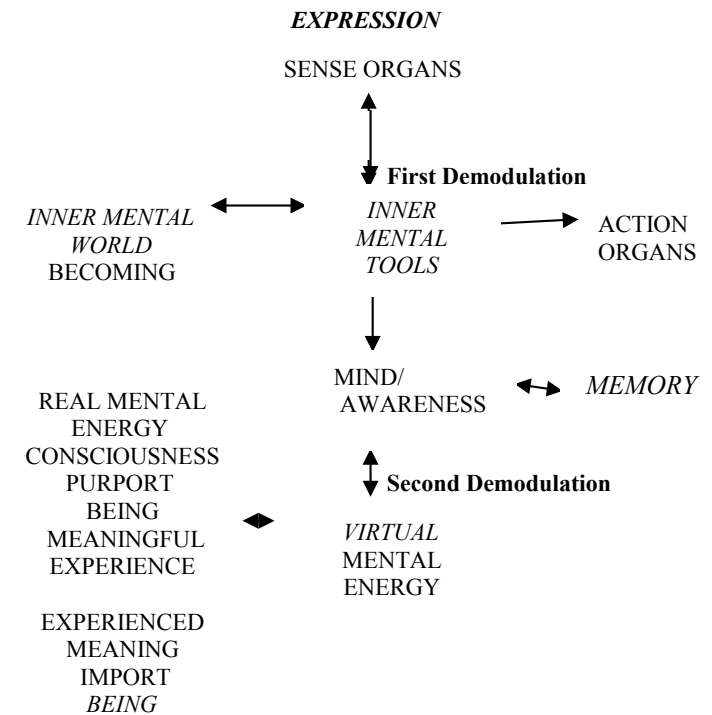
A. EXPRESSION / TEACHING



Reception



B. KNOWING / LEARNING



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