

Vaisheshika

This article summarizes the main ideas related to space, time, and the fundamental particle (*anu*) in Vaisheshika, the ancient Indian tradition of physics. In particular, the conception of *anu*, the fundamental particle of this tradition, is examined at length.

When the universe ceases to be at the end of the cosmic cycle, matter is not annihilated. Rather, the collection of *anu* (atoms) reaches a quiescent state where they do not undergo any motion and thus become invisible to observation. The *anu* in itself is not observable, and is thus an abstraction.

In this framework, time and space arise out of the motion that *anu* obtains due to its interactions.

The characteristics of all that can be conceptualized and hence named and defined in the world through comparison and contrast, is the science of Vaisheshika [1],[2]. This includes a conceptual representation of space, and the gross visible matter, which is taken to be constructed out of the varying motions of *anu*, the most fundamental particle of matter.

Vaisheshika approaches basic concepts in a characteristic manner. For example, the division of time as past, present and future as understood by the observer is said to be a consequence of the fact that time is a function of movement. Vaisheshika is observer centric but it acknowledges that certain entities are necessary within the conceptual framework although there is no direct way of experimental verification of these entities. For example, *anu* – the fundamental particle of matter – is said to be beyond direct perception irrespective of the kind of instrument that is used to view it. Nevertheless, its presence can be inferred indirectly.

In this paper, our emphasis is to examine Vaisheshika through the sutras of Kanada (we use the English translations by Sinha [3]), although the important commentary by the fifteenth century scholar Sankara Misra [4] will also be used for clarification, wherever

necessary. Other important sources on Vaisheshika are references [16-21]. An early overview of Vaisheshika is to be found in the book by Seal [5].

2. *Dravya* – The building blocks

Kanada in his sutras enumerates real entities irrespective of whether they can be perceived through the sense organs or not. These are conceivable by the mind of the observer who is central to his world. These are the nine *dravyas* and these alone describe everything existing in the universe. These are the building blocks of Kanada's world described through their *gunas*/attributes and *karma*/motion.

Space is one among these nine and Kanada recognizes it as an independent positive entity which is neither absence of matter nor an abstract concept. Every *dravya* has an identifier – लिङ्ग – *linga*, which helps identify the specific *dravya*, besides which it has a unique set of *guna*/attributes associated with it.

पृथिव्यापस्तेजो वायुराकाशं कालो दिगात्मा मन इति द्रव्याणि ॥१११५॥

पृथिवी Prithvi, earth आपः Apas, water तेजः Tejas, Fire वायुः vayus, Air
आकाशं Akasam कालः kalah, Time दिक् Dik, Space आत्मा Atma
मन Manas, mind इति Iti, only द्रव्याणि Dravyani, dravyas.

Earth, water, Fire, Air, *Akasa*, time, Space, *atma*, mind are the only nine *dravyas* 1.1.5.

Commentary: All the nine mentioned *dravyas* in the sutra although are translated as earth, water, etc are not to be understood as the planet earth or the drinking water, etc.

These nine *dravyas* have specific *gunas*/ attributes associated to them like the *dravya* earth has smell associated as the primary *guna*/attribute to it. An understanding of *dravyas* can be arrived at by analyzing their attributes and their interaction with the rest of the world. The *dravyas* shall not be analyzed in this paper but it is important to understand the division of the *dravyas*.

The first four *dravyas*: earth, water fire and air are associated with a sense organ each as sense of smell, taste, sight and touch respectively. Although sound is mentioned as the identifier of *akasa* - the fifth *dravya*, which is not translated here as ether for specific reasons, that shall be dealt with separately.

Time, space, *atma* and mind are the eternal or *nitya dravyas* and none of them are perceivable by any of the sense organs is a basic definition in Vaisheshika. Although, these four eternal entities can only be conceived by the mind, they are real existent *dravyas* or entities. Time, space and *akasa* are incapable of motion (by sutra 5.2.21) and it is only the first four *dravyas* and mind which are capable of motion. The mind is also not visible (because it is by nature an *anu* like-fundamental particle, which is not visible by sutra 7.1.23). It is only the first four *dravyas* which compose the matter world. A sort of

motion is applicable only to the matter section of *dravyas* which are the first four among the nine.

The *dravyas* are both perceivable and possess motion represent matter. Among nine *dravyas*, the first four compose the non-eternal matter, mind is the eternal but invisible *dravya* and the remaining four are eternal and incapable of motion.

3 Definition of *Dik* (Space) and *Kala* (Time)

इत इदमिति यतस्तद्विशयं लिङ्गम् ॥२।२।१०॥

इत itah, from this. इदम् idam, this. इति iti, such. यतः yatah, whence. तत् tat, that. दिश्यं disyam, relating to space. लिङ्गम् lingam, mark.

That which gives rise to such (cognition and usage) as “This (is remote, etc.) from this,” – (the same is) the mark of space 2.2.10.

Commentary:

Space is identified through the fact that it can provide the context to describe objects as being separated spatially.

Spatial separation can only apply to matter since eternal *dravyas* which are incapable of motion can neither be separated nor brought together. Although mind can move, it is invisible. Therefore all that remains in Kanada’s classification of *dravyas* is matter. The separation is an identifier and the identification is with reference to the observing mind. It is also significant that the displacement of matter is observed relative to another piece of matter.

The essence of this sutra may be rephrased as: mind recognizes space when matter is displaced relative to another piece of matter.

In Sankara Misra’s commentary of this sutra an argument is built about the similarity of space and time in terms of their *guna*/attributes and a question is raised about the requirement of a new entity called space to be recognized. Both space and time are characterized by their *guna*/attribute of – *partva-apatva*/ being together – separated. In Kanada’s definition, the *dravyas* are understood and defined through their *gunas*/attributes and each of these *dravyas* is non-repetitive and unique. Therefore time and space can be recognized as two separate entities if and only if their difference is established.

The *guna*/attribute of *partva-apatva*/ being together – separated, in time signifies two objects co-existing at the same point of time or being separated in time and the simultaneity in time is defined as a function of the movement of the sun. But that reflects a dependency of time on sun’s movement whereas a *dravya* has to have an independent existence by definition. It is explained that the concept of ‘simultaneity’ in time (in sutra 2.2.6 commentary) indicates the movement in sun and not vice-versa.

On the other hand the *guna*/attribute of *partva-aparatva* being together – separated, in space is reflected by conjunction and disjunction of matter and to be understood as *समकालीन/samkalina* – simultaneity in Time, i.e. the relative spatial separation of matter in the same time frame (same time frame =time measured for the same sun movement).

Questions: The commentary raises certain questions.

1. Spatial separation for objects being defined also with respect to same time frame – Does this imply that time is to be understood as changing with different suns and such different suns and time measures exist?
2. Simultaneity in time reflects the movement of sun – It means that for the observing mind, sun's movement is a logical conclusion from the concept of what we call 'at the same time' in our day-to-day life.

If 'simultaneity in time' is relative to the position of observer (meaning with reference to the same sun) and spatial separation of objects is not, does it mean that space is absolute but time is relative.

Time is said to be *क्रिया विशेषण/* a specific outcome of state of motion - which means time as a larger concept is a function of motion and therefore indicates the general state of motion of the entire cosmos (in the commentary of sutra 2.2.10 of Sankara Misra).

In Yoga Vasistha [6] which discusses Indian cosmological perspective correlated with many other works, a similar concept of varying time with different universes is mentioned. Space for Kanada is devoid of motion and therefore it is only the matter in motion when the cosmos is mentioned and space is still.

This fits with the idea of Indian cosmological model in which time is said to collapse in the rest period between the cosmic creation and dissolution, and that must be true if time is a function of 'state of motion' of the cosmos which comes to a rest in this period between creations and dissolutions [7-13].

4.1 Space as *dravya*

द्रव्यत्वनित्यत्वे वायुना व्याख्याते ॥२।२।११॥

द्रव्यत्वनित्यत्वे Dravyatva-nityatve, Dravyatva and eternity वायुना Vayuna, by Air व्याख्याते Vyakhayate, explained.

Dravyatva (being a dravya) and eternity (of Space are) explained by (the explanation of the same in) Air 2.2.11.

Commentary: Space is eternal (explained later). It is concluded to be a *dravya* and that encompasses hypothesis like – Space is an independent entity

It is existent
It is unique
It is a *padartha*
It has *guna*/attributes associated with it
It can give rise to another *dravya*.
It is incapable of motion.
It is homogenous.

4.2 Space homogeneity

तत्त्वम्भावेन ॥२।२।१२॥

तत्त्वम् Tattvam, Unity. भावेन Bhavena, by Existence.

The unity (of space is explained) by (the explanation of unity of) existence (sutra 2.2.12).

Commentary: Here is a discussion of unity of space which is explained in the commentary by Sankara Misra as – ‘एकपृथकत्वम्’/*eka-pritaktvam*. ‘पृथकत्व’ is a *guna*/attribute of space and in Shankara Misra’s commentary, he defines it as that which differentiates one from two, or it is that kind of a *guna*/attribute which gives a sense of discretion about the state of *dravya* discussed.

In the case of space, एकपृथकत्वम्/*eka-pritaktvam* must refer to the fact that space is found in one state – what ever that is, and shall always be in the same state irrespective of which point in space is considered or even which point in time is considered. This refers to the homogeneity of space. Such a *guna*/attribute fits in with Space being *nitya*/eternal or unchanging.

4.3 Directions in Space

कार्यविशेषेण नानात्वम् ॥२।२।१३॥

कार्यविशेषेण *karya – visesena*, owing to difference or distinction of effects

नानात्वम् *nanatvam*, multiplicity or diversity.

The diversity (of space) is due to the difference of effects 2.2.13.

Commentary: कार्यविशेषेण – *karya visesena* means an outcome the specific kind of work under consideration, and because space is by definition incapable of motion, work in question can only refer to the work done by matter in space. Due to the nature of matter’s behavior in space, it appears that space itself is diverse in nature. The diversity is explained in the following sutras.

4.4 Space Time as the fundamental matrix

आदित्यसंयोगाद्भूतपूर्वाद्भविष्यतो भूताच्च प्राची ॥२।२।१४॥

आदित्यसंयोगात् aditya-samyogat, from the conjunction of the sun भूतपूर्वात् bhuta-purvat, past and gone भविष्यतः bhavisyatah, future भूतात् bhutat, what has taken place or come in to existence; present च cha, and प्राची prachi, east. (The direction comes to be regarded as) the east, from the past, future, or present conjunction of the sun 2.2.14.

Commentary: East is recognized as the direction from which the sun rose and therefore it is in the past. The past present and future divisions of time as a result of the movement of sun are also connected to the spatial directions which are named based on sun's movement. The directions in space are explained as relative to the position of the observer. In this sutra space and time are connected by the 'motion' of sun which observation is also found in many commentaries.

In the commentary of sutra 2.1.5 (त आकाशो न विध्यन्ते ॥२।१।५॥) Sankara Misra while defining the attributes of *akasha* states that not only is *akasha* absolutely color-less but based on the same argument even time and space are devoid of the attributes of rupa, rasa, gandha and sparsha. Time and space have the same attributes associated to them (number, magnitude, *pratakathva*/separateness, conjunction and disjunction). He concludes the commentary of this sutra stating that it follows that time and space are the fundamental entities of everything - "सर्वाधारतैव दिक्कालयोः".

The space and time matrix are said to be fundamental because the mind perceives the world through matter which is identified through the four senses of touch, smell, taste and visibility (the eternal *dravyas* can only be conceptualized by the mind and not perceived). These four *guna*/attributes exist in matter which always exists in a certain space and time combination.

The absence of either space or time indicates absence of motion and as is later established in this paper, no *guna*/attributes can exist in absolute rest or when time collapses to zero. Space and time has to be the fundamental matrix of the matter world, and the observing mind can never escape either Space or Time during the process of observing the universe.

In the *Kanadasiddhantachandrika* of Gangadharasuri Sastri says [14]

परापरव्यवहारासाधारणकारणे परत्वापरत्वे। ते च द्विविधे दिक्कृते कालकृते चेति।

This division of time is said to be caused by the बुद्धि/intelligence and in Space it results from conjunction and disjunction of real matter and so the intelligence of the observer plays a secondary role.

In the footnote of Udayavir Shastri 's book [15, page 103], it is mentioned that Chandrakant Bhattacharya is of the opinion that space, time and even *akasha* are the

same which are seen as different entities because of the nature of the effects as observed by the mind in their interactions with matter.

4.5 Directions

तथा दक्षिणा प्रतीची उदीची च ॥२।२।१५॥

तथा tatha, similarly दक्षिणा daksina, south प्रतीची pratichi, west उदीची udichi, north च cha, also.

South, west, and North also are similarly (distinguished) 2.2.15.

एतेन दिगन्तरालानि व्याख्यातानि ॥२।२।१६॥

एतेन etena, by this दिगन्तरालानि digantarani, intervals of space or direction व्याख्यातानि vyakhyatani, explained.

By this, the intervals of directions in space are explained 2.2.16.

Commentary: In these last two sutras the four main directions east, west, north, south besides which four more directions between these four directions are accounted for as relative to the position of the observer as concepts which arise only because of the nature of motion of matter in Space. Hence Space itself is homogenous and has no division of direction inherent in it.

5.1 नित्यं – Eternality

The nature of both Space and, *anu* - the most fundamental particle of matter (sutra 7.1.8 – explained later) in Vaisheshika are said to be explained in the chapter that discusses *nitya/eternal*.

सदकारणवन्नित्यम् ॥४।१।१॥

सत् sat, existent अकारणवत् akaranavat, not having a cause नित्यं nityam, eternal

The eternal is that which is existent and uncaused 4.1.1.

Commentary: In this sutra Kanada begins his definition of नित्यं *nityam* or the ‘eternal’ but this term is a very imprecise translation of his नित्यं *nityam*. The term सत्/existent has a lot of significance in the school of Vaisheshika because Kanada – a realist, has set himself the task to enumerate everything in the universe through – पदार्थ/predicable - all that which can be named, expressed through words or conceptualized by the mind. Hence all that he describes are not mere theoretical concepts, but true existing entities of the real world.

The term अकारणवत् /not having a cause – is two fold. In terms of the time one must remember that Indian cosmology constantly discusses two kinds of cosmic dissolution: the primary and the secondary. There are time periods mentioned for the creation and dissolution process besides the rest period in between. The way in which Kanada links matter, space, time and mind with ‘state of motion’, the question is raised whether anything other than the *anu* persists through the rest period of universe when time collapses to zero and there is absolute stillness.

Questions: The question raised is, since matter, space, time and mind are all connected to one or the other kind of ‘motion’, does नित्यं /eternal refer to an existence beyond these dissolutions? Is anything transferred from one process of creation-dissolution to another which are said to be cyclic in nature? Since *anu* cannot be reduced any further, it must exist as is through all creations and dissolutions, but since time and space are linked to ‘motion’ are they recreated after each rest period?

5.2 *Anu* in Real Time

तस्य कार्यं लिङ्गम्॥४।१।२॥

तस्य tasya, its कार्यं karyam, effect लिङ्गम् lingam, mark

The effect is the mark (of the existence) of the ultimate *anu* 4.1.2.

Commentary: Kanada has stated in a later chapter (sutra 7.1.8) that both *anu* and *mahat* are explained through the *nitya*/eternal, which must be the reason from Prashastapada to Shankar Misra all scholars explain this sutra with an extension to mean the fundamental particle – the *anu*.

Although in no sutra is the term *paramanu* mentioned by Kanada, all the other scholars talk of *paramanu* as the most fundamental particle of matter. We will not focus on the term, instead try to understand what *anu* in Kanada’s sutras is and for the purpose of this work we shall use the term ‘*anu*’ for the fundamental particle of matter.

Literally the sutra translates to - The work done by it is its identifier. Here ‘it’ refers to *nitya*/eternal as this is a section on the same. By the sutra 7.1.8 which states that both *anutva* and *mahatva* are explained by the eternal, this sutra should also refer to the two – *anutva* and *mahtva*. These terms shall be explored in detail in a later section, for now *anu* – refers to the most fundamental particle of matter and *mahatva* refers to space (*mahatva* – is used in the context of Vaisheshika for more than one *dravya*, but space is definitely one of them)

Therefore *anu* and space are identified by the mind or observer through the work done by these or through their effects. This must be the only way they can be identified by the

mind because by definition they are not perceivable by the human sense organs irrespective of the method employed.

Sankara Misra in the commentary of this sutra discusses that the gross matter which is visible with properties like magnitude, etc implies that it must be made of smaller parts. The parts can be further divided to reach some final indivisible entity. The final or most fundamental entity must have the least possible measure of length, mass or volume – magnitude in total, in order to avoid the infinite regression of such fundamental particle being further divisible (*anu* is a particle because it is capable of conjunction, later mentioned with the sutra). In the fundamental particle of matter which Sankara Misra and other scholars call *paramanu* there are minima of mass, volume or any measure. Kanada does not use the term *paramanu* in his sutras anywhere, yet we mean the same fundamental particle of matter as other commentators who use *paramanu*). Kanada explores the relation between whole and its parts.

Sankara Misra states that if an enormously large piece of matter like a mountain and a small piece of matter like grain were to be composed of infinite parts of *anu*, then the difference in the gross size of mountain and grain being built from the same number of *anu* leads to logical inconsistency. This interpretation is not only used with respect to the gross form in general but in the commentary of sutra 2.1.2 there is a specific mention that the measure of a mountain and a seed would be the same in terms of magnitude, measure and volume if the relation between the parts and the whole were unlimited. Such an unlimited whole-parts relation is not permissible because it is only during *pralaya*- the cosmic dissolution, the limit of the series of parts and wholes reaches a maximum. For a given whole which is the matter state of universe the maximum number of parts is reached during the time of dissolution when all matter is reduced to *anu* form. This is because the only reducible *dravyas* of Kanada are matter which is composed of *anu* and the remaining *dravyas* are not composed of parts.

This discussion of whole and parts throws light on key things.

1. Relation between whole and parts and it raises question about can infinity fit such a loose definition as – infinity added to infinity is infinity, etc.
2. Matter cannot be reduced to anything further than *anu*, and so matter must be conserved in the state of *anu*.
3. If during cosmic dissolution all matter is reduced to *anu* form, then it demands that *anu* be at rest or with zero motion. This concurs with the definition of *karma*/motion in Vaisheshika which by definition is perceivable and *anu* by definition is not perceivable at any time, therefore *anu* in order to be non-perceivable must not possess any form of motion. This is exactly what is stated by the cosmological theory.
4. It further concurs with the idea of *anu* having an inherent potential of acquiring *guna*/attribute which makes sense that the four fundamental distinguishing *guna*/attribute of *rupa*/visibility, etc are associated with four distinct basic motions of *anu* (discussed in a later section).
5. If the maximum number of parts in to which matter can be reduced is *anu* which is during dissolution, then matter must not be reducible to the *anu* state at any

other time for then the whole can be reduced to maximum number of parts at times other than dissolution too. This makes sense because Kanada does not include *anu* as a *dravya* among the only nine that exist in his enumeration of everything that exists and is conceivable. Therefore *anu* does not exist in real time at all or when time is non zero.

6. *Anu* not existing as an individual particle in real time makes sense because different scholars like Prashastapada, etc have an elaborate argument about whether *anu* is bound as a *dvayanuka* or *trayanuka*, etc. i.e., is *anu* found in conjunction with another *anu* in a di-*anu* state or tri-*anu* state, etc.

Once creation of universe begins time begins to click and things are no more at rest. Then the world can be perceived by the observer and some kind of motion must begin (because by definition in Vaisheshika motion is perceivable or observable).

Kanada has an interesting sutra relating to motion of *anu*.

5.3 Initial motion of *Anu*

अग्नेरूर्ध्वज्वलनं वायोस्तिर्यक्पवनमणूनां मनसश्चशध्यं कर्मादृष्टकारितम् ॥५॥२॥१३॥

अग्नेः agneh, of fire. ऊर्ध्वज्वलनं yrddhva-jvalanam, flaming upward.

वायोः vayoh, of air. तिर्यक् tiryak, sideward. पवनं pavanam, blowing.

अणूनां anunam, of *anus* (of the fundamental particles). मनसः manasah, of mind.

च cha, and. आध्यं adyam, initial, first. कर्म karma, action.

अदृष्टकारितम् adrista-karitam, caused by *adristam*.

The initial upward flaming of fire, the initial sideward blowing of air and the initial action (motion) of *anu*, and of mind are caused by *adristam* 5.2.13.

Commentary: In the commentary of this sutra the initial - आध्यं *Adyam* – is said to refer to the first motion that is produced in *anu* by Sankara Misra when the creation of universe begins, like wise the motions of flame of fire, wind and the mind. The reason for these motions are said to be *adristam* – which can literally be translated as unseen (*drista* = what is seen and *adrista* = what is unseen). There are many interpretations about what *adristam* might mean in Kanada’s context, but we shall not dwell on it here. It is clear from this sutra that Kanada describes an initial motion for the *anu* and this must essential be when time begins for time is a function of motion. This sutra implies that *anu* can have two states – absolute rest and a state of motion.

6 Matter and Motion

कारणभावात् कार्य्यभावः ॥४॥१॥३॥

कारणभावात् karana-bhavat, from existence in the cause

कार्य्यभावः karyya-bhavah, existence in the cause

The existence (of color, etc.) in the effect, (follows) from (their) existence in the cause
4.1.3.

Commentary: The terms in the sutra “कारणभावात्” and “कार्यभावः” are in the saptami samasa which is a grammatical condition that implies that the sutra should be understood to mean - because of the existence (of an effect or a specific unique character) in cause it is also exhibited in the gross form. Here Kanada is specifying that *anus* carry some distinguishing feature in them which gets exhibited as the effect in the gross form. Logically any thing that is not in the root cause which is the *anu* cannot be exhibited in the gross form of matter as well.

This is an issue about which the entire School of Vaisheshika has had constant conflict with other school of philosophy historically. If the *anu* has to acquire some thing by which four distinct forms of matter – which are recognized by the observer as those with the four primary distinct *guna*/attributes of *rupa, rasa, gandha, sparsha* – visibility, taste, smell, touch, then on what basis does an *anu* pick up a certain attribute and what is it inherent in the *anu* which makes it a specific form of matter.

The *anu* is said to potentially have something inherent which later becomes manifested once the process of creation of universe begins.

By the above sutra of the initial movement or motion of *anu* which begins with creation, it is clear that the four kinds of matter are related to four distinct kinds of motion of *anu* which in gross form builds up to a certain kind of matter.

Also in Sankara Misra’s commentary of sutra 1.1.6 it is stated that these four attributes of *rupa, rasa, gandha, sparsha* – visibility, taste, smell, touch cannot co-exist simultaneously at the same point of time in the same substrate. This makes sense because an *anu* cannot have four distinct kinds of motion at the same time. Space too is said to be a function of *samyoga* and *vibhaga* – which is conjunction and disjunction which is declared as a kind of motion by Kanada in sutra 1.122.

Besides conjunction and disjunction are permitted for *anu* (sutra 4.2.4) and in Kanada’s science only real things are stated, not probable events. In sutra 1.127 it is stated that matter is formed by conjunction.

Kanada defines the entire creation in terms of different kinds of motion.

7.1 Visibility of *Anu*

महत्यनेकद्रव्यवत्तात् रूपञ्चोपलब्धिः॥४१६॥

महति mahati, in respect of an object possessing magnitude.

अनेकद्रव्यवत्तवात् aneka – dravya – vattvat, by means of its possession of what is composed of more than one kind of matter (dravya)
रूपात् rupa, by means of color च cha, and
उपलब्धिः Upalabdhih, external perception.

External perception (takes place), in respect of an object possessing magnitude, by means of its possession of that which is composed of more substances than one, and by means of its color 4.1.6.

Commentary: Here the condition for visibility is that the perceived entity be अनेकद्रव्यवत्तवात् – that is be composed of more than one kind of *dravya* among the nine defined by Kanada, it will have a perceivable magnitude unlike the *anu*, and must be the substratum of color which does not necessarily mean that it must possess a color. In the commentary Shankara Misra explains that ‘महति’ – the term which is generally indicative of the magnitude due to ‘मुत्तुप्’ प्रत्यय लोप or elision of the *mutup pratyaya* here becomes a गुणवाचक-an adjective to indicate its greatness in its ability to conjunct with many *dravyas* at a time.

अरूपिष्वचाक्षुषाणि ॥४॥१॥१२॥

अरूपिषु Arupisu, in substances not possessing color. अचाक्षुषाणि Achaksusani, not objects of visual perception.

In substances not possessing color, they are not objects of visual perception 4.1.12.

Commentary: In Sankara Misra’s commentary it is explained that all the *dravyas* from air/*vayu* upwards do not possess color and so are impossible to be seen through the eyes or to be perceived no matter approached in which way. Yet a specific mention is made to clarify that this does not mean they are impossible to comprehend conceptually. When the *anu* is in conjunction with more than one *dravya*, then they acquire attributes/*guna* and hence may be perceived. Once *anu* acquires *guna*/attribute, Time is in motion and space too must be in existence therefore *anu* is invariably in conjunction with these two *dravyas*.

It further can possess no motion or spin as in atoms, electrons or other fundamental particles as defined by modern science because by definition motion/karma is perceivable through the senses.

This is because from the sutra on different kinds of motion (1.1.7) rotation or spin is recognized as a kind of motion or action which can be perceived and if the *anu* were to be in a state of motion it would mean that it is perceivable which it is not.

Therefore in conclusion *anu* is not visible in principle with a minima of magnitude and not possessing any kind of motion.

7.2 Is *anu* spherical?

In chapter seven from the sutra number 7. 1. 5 to 7. 1. 19 an argument is built by Kanada as to what 'large' or 'small' generally means magnitude wise and finally he concludes about the *anu* in the following sutra:

नित्यं परिमण्डलम् ॥७।१।२०॥

नित्यं Nityam, eternal परिमण्डलम् Parimandala, what must be the same from all directions like a circle or sphere

The eternal is *Parimandala* 7. 1. 20.

Commentary: This sutra is often translated as the *anu* is spherical. In his commentary on this sutra Sankara Misra points out that the term 'परिमण्डल' is specifically used in the context of Vaisheshika to describe the natural state of the *anu* which, even though cannot be perceived through he senses has to be the same from any direction or it must necessarily possess a symmetry. In the conventional two or three dimension visualization that we are used to it is a circle or a spherical shape.

In Kanada's definition, length or any measurement is a quality associated only with the matter and so the *anu* and space with its eternality is non-measurable or at least any kind of length-measurement is not applicable to it. Kanada has coined a term *parimandala* which is not an adjective for spatial dimension but a concept of logical deduction which is conceived by the mind and is therefore only an abstraction.

Anu therefore by definition and logical deductions are described by Kanada as the fundamental particle of matter which is discrete and not perceivable by senses, with minima of magnitude, yet with a real independent existence beyond the perceptions. These are not further divisible in to components and hence are concluded to be neither destroyable nor created which makes them eternal.

These are not perceivable by an observer and hence are called अतीन्द्रिय/ super-sensible which means 'too acute for the senses'. As these are entities with no association of magnitude, it is meaning less to fix a position for the *anu* and hence they are प्रदेशातीत/non localizable [11].

Space also is eternal, with no measurable magnitude association, not perceivable, indivisible, non-matter and yet a *dravya*.

Therefore 'existent' or real to Kanada would not necessarily mean anything that can be perceived through senses, but also extends to anything that can be conceptualized by the

human mind. The role of the individual who shall understand the predicable is consequently very central and critical.

अणुसंयोगस्त्वप्रतिषिद्धः ॥४।२।४॥

अणुसंयोगः Anu-samyogah, conjunction anu तु Tu, but अप्रतिषिद्धः Apratisiddhah, not-denied.

Conjunction of *anu* is not restricted 4.2.4.

Commentary: Therefore the term *anu* is used to refer to a particle which can go through the operations of conjunction.

Anu is concluded to be a particle.

अतोविपरीतमणु ॥७।१।१०॥

अतः atah, of this (by this mahat magnitude which is perceived through the eyes) विपरीतं

viparitam, contrary (in terms of describable properties) अणु anu, the minima of

magnitude

The contrary of this is *anu* 7.1.10.

Commentary: In this chapter which is discussing the magnitude of *anutva* and *mahatva* – where *anutva* is already established as the minima of magnitude, *anu* is defined as the contrast of *mahat*. Therefore in terms of magnitude *mahat* is the maxima of magnitude or Space is the maxima of magnitude and it is not necessarily infinite at least in Vaisheshika.

Conclusions

The examination of the various sections of the Vaisheshika Sutras reveals that Kanada used his framework of defining observables (matter) through the effect of motion in a very consistent manner. When the universe ceases to be at the end of the cosmic cycle, matter is not annihilated. Rather, the collection of *anu* (atoms) reaches a quiescent state where they do not undergo any motion and thus become invisible to observation. The *anu* in itself is not observable, and is thus an abstraction, which is why we have not used the term “atom” for it.

Kanada's framework defies the usual categories of realist versus idealist, since for him matter in itself is a result of motion. In this framework, time and space arise out of the motion that *anu* obtains due to its interactions. To this extent, the observer is central to Kanada's scheme.

Kanada's emphasis on analysis of categories is also found in the complementary tradition of logic [22-25] and the application of these two traditions to cosmological questions [26-27]. The idea of *tanmatra* in the cosmology of Samkhya, which is viewed as a kind of potential out of which materiality emerges, has features similar to that of *anu* in the Vaisheshika system.