

## RESEARCH ARTICLE

### THERE COULDN'T BE THE WEST, IF THERE WAS NOT THE EAST

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#### ABSTRACT

In treatise "Knowledge" Bahmanyar discussing problems of logic and metaphysics considered the problems of physics which were observed by the Western scholars after centuries. He elucidated the elements of physics in the scientific way of that time. It is a substance structure; refutation of the fact that body consists of indivisible particles; motion and rest; kinds of motion in nature and trajectory; space and time; their peculiarities. Bahmanyar investigated vacuum. There have been widely treated optical phenomena, reflection and refraction of light, focusing of light beams, mechanism of rainbow formation, character of solar beams and mechanism of contemplation. Bahmanyar revealed the essence of sound phenomena; process of origin, propagation and perception of sound and mechanism of echo origin. He considered a number of thermal phenomena, explained such processes as wind, earthquake and conception of subterranean spring water. He studied the process of solar and lunar eclipse as result of which it is also clear that the Moon is not a star, it reflects the light from the Sun. As a result of his investigation Bahmanyar concludes that in the Universe the only motion is the rotary one and thereby he makes a new suggestion of space and time properties "motion being rectilinear and going into the infinity does not exist". Having a logic sensation of non-Euclidean space regularities in XI century Bahmanyar spoke about space distortion which was spoken about in general relativity theory created by Einstein only at the beginning of XX century.

**Key Words:**

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#### INTRODUCTION

In order to develop civilization it is necessary to interpret it properly, to share achievements and acknowledge them as our common human heritage. Scientific and technical progress is the main factor. The temple of science has been built by thinkers, scientists, creators of the world. Science does not belong to any ethnic or religious group. It means that evolution progress made by the representatives of various nations and races will be always in progress. The medieval period in Azerbaijan scientific and philosophical thought history was rather productive. Such thinkers like Abul-Hasan Bahmanyar, Shihabaddin Maraghai, Abu Said Urmavi, Sirajaddin Urmavi, Nasir al-din al-Tusi, Kamaladdin Ardabili, Khagani Shirvani, Falaki Shirvani, Nizami Ganjavi, Mahammad Fuzuli, Kamaleddin Masud Shirvani, Muhammad Nakchivani and ect. Abul-Hasan Bahmanyar ibn Marzban al-Azerbaijani (993-1066), Aristotle's philosophy and physics successor (384-322 BC. E.), a disciple of the great scholar of encyclopedist Abu-Ali Ibn Sina (980-1037), made a contribution to scientific and philosophical thought development. He was one of the major representatives of eastern peripatetism. Ibn Sina (Avicenna) wrote about Bahmanyar: "I love him like my son and even more. I gave him education, brought him up to this level. "When addressed Ibn Sina was called Shaykh Rais. Ibn Sina himself called Bahmanyar "Kiya Rais". In historical and biographical encyclopedia of XII century "Tatimma" "Siwan al-Hikma" by al-Bayhaki ("Supplementary to "Wisdom Repository") where the information of academic philosophers, physicians, astronomers, mathematicians of X-XII centuries has been collected, Bahmanyar is noted as a well known

philosopher. The author writes that Bahmanyar had a talent of coming to the point. Medieval Iran philosophy researcher A. Corben in his work "La philosophie iranienne islamique aux XVII et XVIII siecles" (Paris, 1981) indicates the role of Bahmanyar in the history of Muslim East people philosophical thought.

His works along with the works of his teacher Ibn Sina and his disciple al-Lavraki served as a competent source of scientific knowledge over the centuries - up to new time, that is noted particularly by A. Corben. Bahmanyar's works were written in Arabic. They are "Knowledge," "Decoration," "Joy and Happiness," "The Book of Music", "Metaphysics," "The hierarchy of creatures", and ect. These works kept in libraries and manuscript collections in Istanbul, Vatican, Tehran, Beirut, Cairo, Leiden, London, etc. Later they were translated into both Eastern (Persian) and European languages. In 1851 Mr. "Metaphysics" and "The Hierarchy of Beings" were published in Leipzig in the German and Arabic languages.

The best work of Abul-Hasan Bahmanyar ibn Marzban al-Azerbaijani is considered to be treatise "At-Tahsil ("Knowledge"). This encyclopedic work includes 3 books: I-"On logic", II-"On science called" Metaphysics "", III - "On concrete existing things." In 1971 in Tehran the work "Kitab at-Tahsil" was published in Arabic, in 1983 it was published in Persian. This treatise was translated into Russian, by the well known orientalist A.V. Sagadeyev and published in Baku edited by Academician H.B. Abdullayev in three volumes in 1983-1986. Bahmanyar in his works elucidates a number of issues relating to physics:

- 1 Structure of matter; to refute the argument that the body is involved indivisible particles.
- 2 Motion and rest. Types of motion in the nature and trajectory.
- 3 Space and time, their peculiarities.
- 4 Light phenomena; nature of sunlight and mechanism of contemplation.
- 5 Sound phenomena; process of sound origin, propagation and perception.

In his first book Bahmanyar gives interesting definitions of points, lines, planes, time, motion, etc. Time is the measure of motion, and it refers to continuous number but deprived of its position as its parts exactly past and future do not exist together. "Motion ...is a stay of a moving object within the beginning and the end when it has neither the past nor future. ... Stay in motion is the motion itself. Motion is a change." In chapter "On acquiring parcels" Bahmanyar considers a number of problems including issues of optics, too. "One with eyes to see is able to see surroundings only in the presence of light". Speaking about the lunar eclipse, he writes: "The Earth sometimes occupies an intermediate position between the Moon and the Sun... Heavenly body which having Sun light disappears is covered. The moon is covered."

The Moon for the man at night was in the form of a heavenly body. Here Bahmanyar noted that "any (heavenly body) getting the light from the Sun, has no light ...". That is the Moon is not a heavenly body, it gets the light from the Sun. Chapter 10, Part I, book II "On argument refutation that the body is involved indivisible particles", in which some variants of refuting abovementioned arguments. In XI century Bahmanyar made a conclusion that the particles (atoms) have been given that made up the body were divisible. In book II the problem of origin, matter, form has been investigated. "...One must know that material form never exists separately from the matter.." "position and size are inherent features of the body".

"...Position is a relationship of body parts with one another which shows where they are relative to another. ...Place is the limit of the ambient body covering voluminous body ...". Bahmanyar begins the chapter "On place" like this: "Given matter is usually considered in physics as it falls into this science." Later the emptiness (vacuum) has been studied in this chapter. Bahmanyar had distinctive view points on the problem of vacuum: "... emptiness is a number having the position... emptiness is a body. ... no motion can be in the emptiness: neither rectilinear motion nor circular one. ...there is no natural motion in the emptiness; if there is no natural motion in it, there cannot be forced motion there. ...Besides there is no rest in the emptiness. ...Rest is something that is not moving but it is typical to move in it."

Emptiness is not - something that can move in it." Actually he denied the possibility of the appearing motion and especially forced motion in vacuum. He writes that there must be outside effect to be appeared. As in the vacuum the presence of foreign subject is impossible so forced motion is impossible either. The logical conclusion was made when the laws of conservation of momentum were not known. Motion was a high - priority problem of the time. Bahmanyar examined given problem very thoroughly. He writes about it in II and III volumes. The natural motion is what the body executes by its

nature but the forced motion occurs when the body sets in motion unlike its nature, for instance when somebody gives the motion up to the stone.

### "Nature is not motion"

In chapter "About the time" the author writes: "... time is a number of motion. ... If there is no motion - there is no time ... It (time) must be served as a measure of originless and continuous motion. The form of circular motion so by which the values of other motions are measured. ..." The III-rd volume of the book "At - Tahsil" ("Knowledge") is known as "About particularly existing things" by Bahmanyar the subject of science complies with the subject of physics. Bahmanyar called the first unit (8 chapters) of the book "Physics". By Bahmanyar "the nature of body is what serves as an origin for change or rest peculiar for itself. The form of body is the main point of existence due to which it exists. The matter of body is something like acts as a form carrier." Bahmanyar writes "I say, everything which is destroyed has been arisen formed as a body has been destroyed." In chapter I unit II, the author writes: "...figures of the simple natural bodies must be simple i.e. spherical..." Further Bahmanyar contends: "Be aware: the Earth requires a spherical figure for itself..." Bahmanyar considers that "bodies set in motion only to come back the natural state..." if there is a tendency to be increased the motion has an objective, reaching it the rest is taken place... ...discontinuous rectilinear motions must be complete. ...The state of rest is measured by time."

From Bahmanyar's point of view mechanical motion is distinguished by as in trajectory i.e. rectilinear, curvilinear, as in nature i.e. natural (uniform) and forced (accelerated). In this case Bahmanyar comes to the logical conclusion that rectilinear motion can be as natural as forced. However he concludes curvilinear motion cannot be natural one. By Bahmanyar "natural motion is that one which arises from the force in body heading for aim due to its nature and appropriate to its nature when nothing inhibits it. The motion carrying out by force is that which motive is out of the moving object which is not appropriate to the nature of body." Bahmanyar writes: "Any motion not being rectilinear is not a natural one." Whereas Aristotle regarded rotational motion (for instance, the motion of celestial bodies) to be natural and eternal."... that what circular motion is directed it is identical to the point from which there is a removal is taken place." If one considers the celestial body consists of terrestrial matter according to post-Galileo physics its natural motion is included the motion along the straight line with constant rate. Therefore to make body rotate it is necessary to apply the force to it.

Dutch physicist Christiaan Huygens first determined value and direction of centripetal forces in analytical form, which was the basis for the theory of planetary motion created by Isaac Newton. The problem of planetary motion, which ancient Greeks, astrologers of Chaldea and Vavilon, founder of geocentric system Kopernic and finally, the great Galileo turned into the applied scientific one at that time. It become accurate field for Newton's laws use and we can say that the solution of planetary motion problem by Newton's law was the best advance in XVII century and "Natural and eternal" planetary motion by Aristotle turned to require some force. Yet in XI century Bahmanyar in his book "At-Tahsil" wrote:

"...Circular motion can exist because there is a reason ... celestial circular motion has an origin laid back the matter, corporal force presenting special objects, force referred to the desire and motive force."

Speaking about the motion Bahmanyar expressed himself: "...there have been three variations of motion: one is around the middle, the other is from the middle, the third is to the middle where centripetal force elements exist. As a result of investigations Bahmanyar concludes that the only motion in the Universe is rotational and thereby he makes a new proposal of space and time properties. Bahmanyar writes: "...As soon as you know measurements finiteness it must be clear to you from above mentioned that there is no motion rectilinear and extending to infinity."

### Space contortion becomes visible.

It is known that since ancient times up to XIX century geometry associated with famous Greek philosopher and mathematician Euclid took a prevailing position in world science. One of the postulates says that in given plane through given point one can draw one straight line parallel to given straight line. In XIX century two systems of non-Euclidean geometry were produced. The first system is geometry associated with Russian mathematician Lobachevsky, according to his view through given point can be drawn a great many of straight parallel lines. The second one, Riemannian geometry is geometry of sphere. In this case one cannot draw any straight line, parallel to given one. For a long time no one could determine the space they lived in: Euclidean or non-Euclidean space. By Newton's theory gravity space has Euclidean behavior, i.e. there has been suggested presence of absolute direct lines. However in general Einstein theory created at the beginning of XX century it is shown that space has non-Euclidean behaviour, i.e. all lines are closed and absolute straight lines are lack.

Einstein's equations in general relativity theory establish link between the matter distribution and geometry properties of space and time, i.e. particles and fields in space distort it. Distorted space and time are the main elements of the given theory. In XI century Bahmanyar accepted the presence of space distortion, against of concept of infinity. He writes: "...infinity has non – existing nature". Further analyzing the phenomene of motion origin under the force within the time in chapter "Effect of corporal force is finite" Bahmanyar writes: "One force is different from another in several aspects: by rate of effect, by length of time." He extends above mentioned suggestion: "Therefore none of the body can dispose the force of infinity intensity to set in forced or natural motion as it should be required that its effect runs in time while the motion being in no time is impossible but it must be just carried out in time as the more intensive is force the shorter is length of time." Thus, at infinite force of motor the time is equal to in the limit of zero, i.e. there was no motion at all.

This scientific aphorism was made by Bahmanyar in XI century. Unit III, chapter 4 is named "All about beams, light". This chapter deals with optics problems: solar beams, luminescent body, reflection of light beams, observation mechanism and ect. "Sight perception is carried out by sight organ transformation when observation reaches it.

But observable object itself cannot reach it there by mentioned transformation caused by the fact that the image of observable object manifested in sight body. Then Bahmanyar explains advent of image by "ice – like moisture" (modern concepts "glassy substance" - crystalline lens) and sight ghost (retina). Explanation like this is close to the modern one. In chapter "About unsoundness of several opinions of mirror reflection of beams" the author elucidates the process of light beam reflection. "... the cause of reflection is the smoothness. ... If the light source directs beams around the nature they change direction under the factor in force. ...Any smooth surface is the cause of any reflection transfer. ...beam in one case reflects from the water, in other cases penetrates in its depth." Bahmanyar also treats with the mechanism of reflection. He writes about the firing mirror: "Firing mirror initiates combustion because there is a point in which light come together, as a result the given point is the brightest of all parts of mirror and brings about the spontaneous fire. ...because reflected in (firing) mirror sting. "Bahmanyar regards "the colour is brought about by light." In chapter V "About taste, smell and hearing" Bahmanyar analyzes given physical human senses and determines sound mechanism and sound by itself. "Sound is something arising from oscillations of fluid wet body as air or water which appears to be between two collided bodies".

About "echo" phenomenon Bahmanyar writes: "when the object comes up against any obstacle like a mountain or a wall and is reflected it must be appear to be compressed between the oscillation to be hit on the wall or mountain and the thing to be hit by the air and is reflected it must appear to be compressed between the oscillation to be hit by the air and is reflected springing under its pressure back and taking the form of the first. ...each sound has its reflection."

Bahmanyar in chapter "About clouds, rainbows, winds, earthquakes, meteors, comets, water and mineral occurrence, sky color and ect. He examines all nature phenomena". Since ancient times human being tries to understand everything around him. The problem of intellect and deduction of what is taken place with and around (in nature and Universe). In chapter "About intellect and deduction" Bahmanyar gives a special attention to the given problem. He writes: "strong deductive object is the object having strong existence." Bahmanyar supposes: "Complete delight can be achieved due to knowledge of real essence of existing things. But the power of intellect disposes to deductive forms of beginning."

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