

## Civilization Scale According To The Speed Of Light

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### SUMMARY

*In this study, a new approach has been made depending on the level of world civilization, the speed of light. In this classification, the speed of light was accepted as the reference speed and was also called TIP(0). Civilizations under TYPE(0) were named as TYPE(-) civilizations and subclassified from R=-1 to R=-11. Civilizations above the speed of light or civilizations above TIP(0) are named TYPE (1) and TYPE (2) and subclassified from R=1 to R=12.*

*While classifying the civilizations, it was made according to the effect of the energy used on the speed of the mechanical systems. Four basic types of energy have been accepted as energy types. These are: 1. The energy sources we will use now and in the future, 2. E1 energy that we will use in the future, 3. E0 energy source that has reached the speed of light and exceeded the speed of light, 4. E2 energy source that will reach the multiples of the speed of light.*

*In the future, E1, E0 and E2 new energy types, which are not used today but will radically change science and technology, are also foreseen. To reach the reference speed, first the upper limit of the E1 energy type and the mechanical systems R=0 or TIP(0) light speed civilization level will be reached. After reaching this speed, the E0 energy type will start to be used. Depending on the E0 energy type, science and technology will re-form. Then, the TIP(0) light speed energy (E0) civilization will reach the E2 energy level by developing science and technology. E2 energy will reach multiples of the speed of light, making radical changes in science and technology.*

*With the technology developed depending on these two new types of energy, we will first reach the solar system and then all over our own galaxy in the average human lifetime. With E2 energy, we will cross our own galaxy and reach neighboring galaxies and then new universes in as much time as human life. As the last stage of civilization, there will be no concept of time-space-distance.*

**Keywords:** *Light, Era, Civilization, Light era, Scale*

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### I. INTRODUCTION

The classification of world civilizations is done at different scales. Among these scales, the civilization of energy use is the three-stage classification made by the Russian astrophysicist Nicolai Kardashev in 1964. The basic scale of Kardeshev civilization is; It is based on the total energy consumption in our world [1-2]. It has scaled for energy consumption or by the size of the energy used. This scale did not take energy efficiency into account.

Kardashev, while researching intelligent life outside Earth in 1964, thought that the level of development of extraterrestrial cultures depended on two basic conditions [2]. Considering the size of the energy consumption of the technological products used in these studies, he realized that large energies are needed for space travels. He also emphasized the importance of energy sources.

The other is Barrow [3] and Marina civilization classification [4]. John D. Barrow's classification method, on the other hand, recognized the increasingly micro-scale version of the ability to manipulate their environment. The availability of the environment in micro-dimensions is the state of matter ordered towards the smallest building block. Finally, it is Marina Alberti's classification in the energy-purifying ecology approach that evolves towards its planet. It is the planet itself, not the civilization that is classified in this system. Brief information about these civilizations is given below.

## II. CIVILIZATION CLASSIFICATION

### 2. 1. Energy Civilization

According to Kardashev's scale, using and controlling the energy sources of all planets in space, in short, keeping the planet under full control and civilizations that have this technology are Type-1, the civilization that controls the solar system is Type-2, and the civilization that can control a whole galaxy technologically is Type-3. It is designated as -3.

According to this scale, the first is technology and the other is the energy required for this technology. Our technology may be sufficiently advanced, but economic energy may not be available for this technology. Or your energy resources may be insufficient or may not be economical. The other case may be energy, but you may not have the technology to use it. As a current example of this, it is the best example for not being able to use the energy/force of gravity or today's technology. This scale of Kardashev was developed by Michio Kaku, Robert Zubrin and Carl Sagan with additions [5-8].

For the Kardashev scale, astronomer Carl Sagan

$$K = \frac{\log_{10} P - 6}{10} \quad (1)$$

developed equality. Carl Sagan defined K: Kardashev Scale in this equation, P: Energy use. The energy consumption level of our world and humanity is calculated as K=0.724 type. According to this scale, our world has not even passed the Type-1 civilization level yet.

Kardashev's energy classification is based on energy consumption. According to this scale, it is defined as Type-1 (10<sup>16</sup> Watt), Type-2 (10<sup>26</sup> Watt) and Type-3 (10<sup>36</sup> Watt). However, other astronomers have added Type-4 (10<sup>46</sup> Watts) and Type-5 to this scale [7-8]. Thus, the Kardashev scaling is classified as a five-stage civilization. This civilization classification is based on people's energy use. In other words, the more energy people use, the more civilized they will be. Or people's use of energy sources other than their own stars is considered another measure of development. However, this scale ignored energy efficiency.

Type-0 (Beginning - Sub-Universe Civilization): This civilization obtains its energy and raw materials from organic-based coal, oil, petroleum and water resources. The use of the energies obtained from such sources as a source in space travels prevents space rockets from going very fast, because the own weight of the fuels prevents them. For this reason, it also limits the speed of spacecraft. The journeys of these civilizations will be slow, so they will be limited to our own planet.

Type-1 (Planetary Cultural Civilization): It is a civilization that can benefit from all kinds of energy resources of the planet we live on. These energy sources are; Solar, hydro-thermal, wind, hydrocarbon and coal etc. are energy sources. The civilization characterized as Type-1 should have the ability to use all energy sources on the planet.

When we reach Type-1 civilization, some processes on our planet can be controlled technologically. Some processes may also reach predictable science and technology. These controllable processes can be in the form of earthquakes, volcanism, tectonic movements, limited or early warning systems in fauna, flora, climate and ocean sciences, or direct controlled response to minor events. For example; While an earthquake of 7 or more is expected in a region, tensions can be reduced by discharging the energy of 4-5 magnitude in a small controlled manner, and thus earthquake control is achieved. While the flooding of Tsunami waves caused by earthquakes in the open seas can be prevented, climatic events or precipitation can also be controlled.

Type-2 (Interstellar-Civilization): Apart from the stellar civilization or the planet we are on, it is the type of civilization in which the star it orbits can also use its energy. In other words, it is a type of civilization that uses all of the sun's energy. The most obvious example of this is the Dyson Sphere.

It proposes a Type-2 interstellar civilization, imaginary Dyson sphere and similar structures. These structures are based on the use of all the energy produced by the star. There is no limitation for energy production either. It is the civilization that can gather all the potential energy of its star. The civilization at the level to realize the Dyson sphere can collect 4x10<sup>33</sup> erg/sec or 4x10<sup>26</sup> watts or all the energy that can be obtained from the Sun. This energy generation also includes fission and fusion energy production systems. The sun is used as a large energy reactor.

It is the level of civilization where human beings start to think bigger and approach the limit values in the use of energy resources in our world. This civilization consumes 1 billion times more energy on average than the Type-1 civilization. It is the civilization that transforms and manages energy resources with applications such as Asteroid and planetary energy mining for energy production.

Type-3 (Galactic Civilization): This civilization level is the civilization that can benefit from all the energy sources of the galaxy it is in. For example, dark matter, dark energy, white matter, white energy, hot dark matter, cold dark matter, neutron stars, quasars are civilizations that use energy sources that we know or do not know.

This civilization targets energy consumption such as  $4 \times 10^{44}$  erg/sec or  $4 \times 10^{37}$  Watt. Such great energy consumption can colonize the galaxy we live in and generate energy from tens or hundreds of millions of stars. This civilization can travel through space and generate energy from countless planets. It is the Type-3 civilization, which is the last digit of the Kardashev scale. At this stage it is the level of technology and science that uses the resources of an entire galaxy, not just planets and stars.

The Galactic Civilization uses at least 100 billion times the total energy power used by the Type-2 civilization. It is a civilization built on the science and technology of Type-2 civilization. When the Type-3 civilization is reached, they can include billions of star systems in their galaxies into their own civilization for the development of this civilization.

Type-4 (Universal Culture-Intergalactic civilization): This civilization is defined as an intergalactic cultural interaction covering the entire visible universe. The technology level will be the ability to harness the energy of trillions of stars in the universe. Thanks to this ability, they will be able to travel between the stars. These communities will eventually also have developed enough technology to ensure human longevity.

It is a civilization built on the scientific and technological knowledge gained in Type-3. It is a variant of the Kardashev scale that has been continued or added to micro and macro scales. Type-4 civilization is a culture of intergalactic civilizations. It is the time when galaxies influence each other scientifically, technologically and culturally, where intergalactic cultural interaction develops.

Type-5 (Multi-Cultural Civilization): It is a civilization that has the ability to change matter, space-time and multi-dimensional structures on the scale of the universe. Type-5 and higher civilizations are the level of civilization that can reach not only galaxies but also the universe or multiverses.

## 2.2. BARROW CIVILIZATION CLASSIFICATION

John D. Barrow's civilization classification is the micro-level version of the ability to manipulate their environment [3]. According to this system called micro-dimensional specialization, the availability of the environment is the state of matter ordered towards the smallest building block. This order is denoted by minus (-). According to this classification;

Type I (-): Activities in which an organism can manipulate dimensions close to its own scale. It includes similar activities such as constructing buildings, mining, shredding, tool making. It is a civilization that includes engineering, architecture and science.

Type II (-): It is a civilization that can manipulate genes and change the development of living things. It can cut living tissue, perform organ transplantation, heal the sick cell, and have in-vitro fertilization. It covers the field of science such as medicine, genetic engineering, molecular biology, zoology.

Type III (-): Can manipulate molecules and molecular bonds, create new materials. It covers areas such as micro technology.

Type-IV (-): Can manipulate isolated atoms and make designs at the atomic scale. It includes nano-technology and molecular physics disciplines.

Type-V (-): It can manipulate the atomic nucleus and arrange the nucleons that make it up. It is within the field of nuclear physics.

Type-VI (-): Can manipulate the smallest particles we know of, such as quarks and leptons. It covers the field of particle physics. The hadron collider is the greatest achievement in this field.

Tip-Ω (-): Omega eksi sınıfı, uzay/zamanın yapısını değiştirebilir.

The human species was able to pass the TiP-III (-) and Type-IV (-) classes. It has some successes in the Type-V (-) class. In the Type VI (-) class, there are successes thanks to the Hadron Collider. Of course, there is no study on the Omega (-) class yet.

## 2.3. MARINA CIVILIZATION CLASSIFICATION

The civilization classification of Marina Alberti, on the other hand, was prepared according to the energy-purifying ecology that developed against the planet [4]. In other words, it is moving towards the planet type

whose mutual evolution with the planet is the most successful. It is for civilizations that can transform with their technology without harming the health of the planet. It is the planet itself, not the civilization that is classified in this system. The classification of this civilization is;

Type-I: Planets that do not have atmospheres, such as Mercury.

Type-II: Planets with thin atmospheres such as Mars.

Type-III: Planets with organic life forms. But life forms are not at a level to interfere with the evolution of the planet.

Type-IV: Level at which organic life forms interfere with the planet. They can build buildings, bridges. They can reconstruct trees, mountains.

Type-V: The level at which organic life forms can change the evolution of the planet. Now, high-tech life forms have begun to reside on the planet. They can interfere with continents, atmosphere and oceans. They can design geological structures such as synthetic continents. Humanity In Carl Sagan's book "Pale Blue Dot" written in 1994, "In Type-IV; however, it develops as a life form that progresses with small steps towards Type-V." World civilization continues to progress.

### III. LIGHT SPEED CIVILIZATION

One of the scales frequently used in space measurements is the speed of light and the light year. The main reason for using this is that since space has very large dimensions, there is a need for numbers with plenty of zeros compared to other measurement units. Instead, the unit of speed of light is used for close distances, and light years are used as standard for long distances. While intergalactic light years are used, in our own solar system, we reach everywhere with the one-day path of light. In other words, the diameter of the Solar system we live in is close to  $\frac{1}{2}$  light day. Therefore, we can reach every part of our solar system in one light day. The diameter of the Milky Way galaxy we are in is between 100,000-150,000 light years according to open sources or 200,000 light years according to the latest researches. According to this situation, it is not possible for human beings to travel the Milky Way throughout their lifetime.

According to studies conducted in recent years, it is estimated that there are more than 2 trillion galaxies in our universe. The Andromeda galaxy, which is the closest to the Milky Way galaxy, is stated to be 2.5 million light years away.

There is a 25 times distance ratio between the size of the Milky Way and the nearest Andromeda galaxy. Considering this simple ratio, the number of Galaxies X light years distance = .. it simply gives us information about the size of the universe. According to this simple calculation, it corresponds to  $1012 \times 2.5 \times 6 = 5 \times 10^{18}$  light years. Considering that some of the galaxies are billions of light-years away or large, the size of the universe can be up to  $5 \times 10^{34}$  light-years. Maybe the universe is bigger than thought. Again, according to open sources, the age of our universe is estimated to be 11-13.5 billion years. Even if the expansion of the universe was linear with the speed of light in the big bang, at least  $5 \times 10^{18}$  light years would be needed. Or the expansion of the universe must be between 454,545-384,615 million times the speed of light at some times. These velocities are calculated as linear velocities. In this case, the expansion of the universe must be at speeds much greater than the speed of light.

Considering the large numerical values, new types of energy must definitely exist for mass velocities to occur. Whatever the name of this energy, simple calculations reveal the necessity of this energy type. If we can rediscover this energy, it will allow us to travel through the universe at speeds much greater than the speed of light. You can take the speed of light as the reference speed under certain conditions, but other than that, it is not a correct approach to consider the speed limit. For this, we can only travel our own Milky Way for a human lifetime if we have science and technological tools that go faster than light.

While classifying and tabulating the speed of light, R (Range) represents the level. Table.1 basic unit is the speed of light as m/s or Km/s and the speed of light level is defined as  $R=0$  basic scale speed. In Table.1, the proportional multiples of the speed of light are taken for the R values. Speeds less than the reference speed are defined as  $R=-..$  and speeds greater than the speed of light are defined as  $R=...$ . So sevilier is defined as  $R = -... < v^{\circ} R = 0 < R = ...$ . In Table.2, the basic scale of light years is taken and defined as  $R=0$ . Intervals less than one light-year are given in months (R). In Table.2, light years and their distances are given. Equations 2 and 3 are also developed for these classification calculations.

$$R = \log_{10}(v_1) - \log_{10}(v) \quad (2)$$

$$L = V^{\pm i=1,2,3,\dots,R} \quad (3)$$

The variable in Equation (2 and 3) is R: civilization level, L: length, distance, v: light speed, and v1: relative speed.

The TYPE(-) period in Table.1 has been popularized from R=-1 to R=-11. This leveling was made by taking the full powers of the speed of light proportionally and at R=0, the speed of light was taken as the base scale.

In this study, the speed of light is taken as 300.000 Km/s and 300.000.000 m/s. Especially when calculating the intra-world velocity, our Earth remains very small. For this reason, m/s unit is used to compare the speed civilization level. Because when considered at the speed of light, our Earth appears to be a very small planet. The other is the standard speed definition for sea and land vehicles in the Earth's atmosphere, as Km/hour. Tables have been made considering both of these situations. Simple calculations based on the speed of light;

Speed of light = (300.000.000 m/Second or (1.080.000.000 Km/hr)

Logarithm of speed of light:  $\log_{10}(300.000.000) = 8.47712125471966$

1 hour speed of light: 1.08x10<sup>9</sup> Km/Hour

24 hour speed of light = 2.592x10<sup>10</sup> Km/Day

Light-year:300.000.365.24.3600= light-year epoch: 1 light-year = 9.4608x10<sup>12</sup> Km/year

Example calculations:

Example 1. The speed of light is defined as the technology civilization level constant: R, the speed of light v: 300 000 km/s and the relative speed is defined as v1. If the speed of light is 300000 Km/s or 300.000.000m/s and the relative speed=3000km/s, what is the light speed civilization level?

SOLUTION :

Speed of light: 300.000.000 m/s, relative speed v1=3,000.000 m/s then R=?

K=?

$$R = \log_{10}(v_1) - \log_{10}(v)$$

$$R = \log(3,000,000) - \log(300,000,000)$$

$$= 6.47712125471966 - 8.47712125471966 = -2$$

Since the light civilization level is calculated as R=-2, it corresponds to R=-2 in Table.1. In other words, the level of civilization is low compared to the speed of light, or the level of civilization it is in has developed by 1/100 of the civilization of the speed of light.

Example 2. If the speed of light is V: 300.000.000 m/s and what is the velocity v1 for civilization R=-2?

SOLUTION: The speed of light is 300.000.000m/s and R=-2. V1=? Equation (2) is used to calculate it.

$$L = v^{\pm i=1,2,3,\dots,R}$$

(300.000.000)<sup>R</sup>=(300.000.000)<sup>-2</sup>=3,000,000 m/s is found as

The same method was used to calculate the speed of light civilization level (-) values in Table.1. The speed of light civilization actually corresponds to the level of science and technology in our world. Communication systems for these science technologies are defined as computers or briefly IT, all application areas of biology. Light speed civilization scaling indirectly includes developments in all fields of science and technology. It does not only include the speed and energy diversity in mechanical systems. Indirectly, it establishes a relationship between the energy used and the level of development of the technology. In the future, measurement units will completely change and new standard units will be created by revising the basic units used today according to the speed of light technology. As a result, measurement technique will affect all other fields of science.

Table.1. Light speed civilization classification

LEVELS OF CIVILIZATION BASED ON THE SPEED OF LIGHT					
LIGHT SPEED AND LIGHT SPEED DEVELOPMENT LEVELS - MULTIPLIER	Level of Civilization.	Speed (m/s)			
	R=-11			TYPE (-)	
	R=-10		0.03 m/s		
	R=-9		0.3 m/s		
	R=-8	Walking civilization	3 m/s upper limit		
	R=-7	Running civilization	30 m/s upper limit		
	R=-6	Motor vehicle civilization	300 m/s Upper limit 1080 Km/H		1080Km/s Upper limit
	R=-5	Aircraft civilization -10800 Km/H	250-3000 m/s Upper limit		Upper limit limit velocity values of known energy types of world classical science.
	R=-4	Maximum speed limit in the atmosphere. 108.000 Km/H	30.000m/s Intra-atmospheric upper speed limit.		
	<b>E1 NEW ENERGY SOURCE</b>				
	R=-3	1.080.000 Km/H	300.000 m/s		New energy sources, speed of light science and technology the beginning of the age
R=-2	10.800.000 Km/H	3.000.000 m/s			
R=-1	108.000.000 Km/H	30.000.000 m/s			
R=0	<b>LIGHT SPEED AGE</b>		TYPE 0		
		<b>Time (Second,s)</b>			
R=1		10	TYPE 1		
R=2		100			
R=3		1000			
R=4		10.000			
R=5		100.000			
R=6		1.000.000			
R=7		10.000.000			
R=8		100.000.000			
R=9		1.000.000.000			
R=10		10.000.000.000			
R=11		100.000.000.000			
R=12		1.000.000.000.000			
<b>E2 NEW ENERGY SOURCE</b>					
R=13		1.000.000.000.000.000	317.097,919 Years		
		1.000.000.000.000.000.000	3.170.979,19 Years		
		1.000.000.000.000.000.000.000	31.709.791,9 Years		
....	....	....	....		
....	....	....	....		
			TYPE 2		

The speed calculations made are used to make an easy comparison in terms of hours and seconds. The speed of light scaling also makes an indirect classification of the energy types used to compare the speeds of the technological, mechanical and other systems used in our world and to obtain these speeds. It also indirectly includes the generation and consumption technologies of all kinds of energy. Energy consumption should not be taken as a base scale, on the contrary, energy efficiency can be taken as a base scale. The efficiency of all mechanical and thermodynamic systems used today is very low. Therefore, system energy efficiency is more important.

In this scaling, especially the age of light speed will be the civilization in which technologies with very high energy efficiency are used. While traveling in the universe, galaxies and interstellar travel, it should be taken into account how long the human lifespan will be.

In this civilization, the aim should be not how much energy is used, but how efficiently energy is used. In fact, it is how we improve our civilization level by using less energy while doing the same job. After reaching a certain energy consumption, basic needs will be minimized. After that, energy consumption will not be due to necessity, but many things will be due to pleasure or luxury consumption. In addition, the technology used must be compatible with human life in order for inter-universe, interstellar and interplanetary transportation to be possible.

Table.2. Light year civilization classification.

CIVILIZATION LEVELS BASED ON LIGHT YEARS						
		Civilization Access Level (Km)	Time	Types of Civilization		
LIGHT SPEED AND LIGHT SPEED DEVELOPMENT LEVELS	MILK WAY GALAXY CIVILIZATION	R=-11	7.88940x10E11	1 Month	TYPE (-)	
		R=-10	1.57788x10E12	2 Months		
		R=-9	2,36682x10E12	3 Months		
		R=-8	3.15576x10e12	4 Months		
		R=-7	3,94470x10E12	5 Months		
		R=-6	4,73364x10E12	6 Months		
		R=-5	5.52259x10E12	7 Months		
		R=-4	8.31152x10E12	8 Months		
		R=-3	7.10046x10E12	9 Months		
		R=-2	7.8892x100E12	10 Months		
		R=-1	8.6783x100E12	11 Months		
		R=0	LIGHT YEAR EPOCH		TYPE 0	
				Light Year		
	R=1	9.46728x10E13	10	TYPE 1	THE SPOOKY QUANTUM ERA	
	R=2	9.46728x10E14	100			
	R=3	9.46728x10E15	1.000			
	R=4	9.46728x10E16	10.000			
	R=5	9.46728x10E17	100.000			
	GALACTIC CIVILIZATIONS	R=6	9.46728x10E18	1.000.000	TYPE 2	THE QUANTUM ENTANGLEMENT ERA
		R=7	9.46728x10E19	10.000.000		
		R=8	9.46728x10E20	100.000.000		
		R=9	9.46728x10E21	1.000.000.000		
		R=10	9.46728x10E22	10.000.000.000		
		R=11	9.46728x10E23	100.000.000.000		
		R=12	9.46728x10E24	1.000.000.000.000		
	..	..	..			
	....	....	....			

AGE OF LIGHT YEAR: 1 light year = 9,46728x10<sup>12</sup> Km

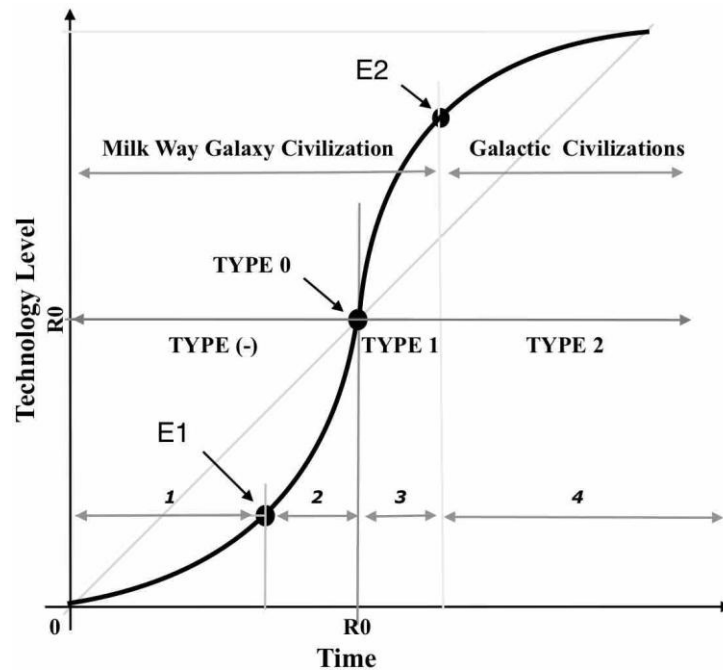


Figure 1. Civilization-science-technology-time change depending on energy level.

As seen in Figure.1 (1,2,3,4) 4 types of energies are defined. These;

1. All types produced using current science and technology. These are technological products used with energies. This time interval corresponds to the time interval from the beginning to the E1 energy source in the time axis. In other words, it represents all kinds of products produced with today's science and technology. Among these, it determines the upper limit value of the speed, especially in mechanical systems.

2. E1, energy level stage, classical energy types have completed their economic life. Instead of these, depending on the development of new science and technology, the newly found energy E1 period begins. E1 energy science and technology has completely changed. The era of fossil fuels and all other used energies is over. Because the E1 energy source will be completely different from the previous energies. The efficiency of all technological products using E1 energy will be very high, and on the other hand, the amount of energy they use will be very low. In other words, it is the beginning of the technological product era with very high efficiency. With the invention of electrical energy, it will be as different as not using previous technologies. E1 energy will be a brand new science and technology and represents a technology revolution. With this E1 energy, we will reach the TIP 0 R0 civilization level. In other words, it will lead mankind to the speed of light civilization.

3. E0, TYPE-(0), R0 and civilization level represent the state in which the speed of light civilization has been reached. After that, a new energy, the E0 energy period, will begin. It is the period of development of science and technology in order to reach multiples of the speed of light with this energy. We think that this period will take a long time. Because in order to reach multiples of the speed of light, new information and all kinds of technological materials are needed. By making all kinds of objects needed with science and technology, technology corresponding to multiples of the speed of light and multiples of light years will be produced. The upper speed limit value of this technology will also be the E2 new energy source.

4. The E2 energy era represents the type of energy in which science and technology radically changed completely. Now, science and technology has gone as far as fiction. Theoretically, the concept of time and space has disappeared in speed. Technology, where everything is instantaneous, is the energy of the period.

TYPE (-) civilization represents civilizations under the speed of light. This civilization consists of different stages from  $R=-1$  to  $R=-11$ . We are living in different periods in the speed technology of land, sea and air vehicles that we can reach technologically at these stages. At this scale, the upper limit of the speed of land motor vehicles on normal highways for general situations in our modern world has been determined as 1080



Km/Hour. Normal highway traffic in the world is approximately 1/5 of this speed. In special cases, this speed value may be exceeded. However, in general use, it is not known when this speed is reached by land vehicles. Or perhaps this speed cannot be reached at all with today's urban planning. The specified speed can only be reached on very special limited roads. In addition, the automobile technology used in automobiles needs to be further developed in order to reach the upper limit value of energy consumption, especially efficiency. The technologies used are both very inefficient and not environmentally friendly. The upper speed limit of land vehicles in general traffic is foreseen as 300m/s or the speed of sound (340m/s) is approached.

If the TYPE (R=-5) civilization level is, the speed limits of the aircraft flying in the atmosphere of the world under normal conditions are foreseen between 1000KM-10800Km/Hour. Today's technology has reached only 1/10 of this speed limit value under normal conditions. Under normal conditions, we do not expect the upper speed limit to be reached in a short time. Economic efficiency in the technology used in aircraft does not allow this situation in terms of technology and materials. The highest possible speed limit value in the Earth's atmosphere is the TYPE (R=-4) technological level. The speed limit of the vehicle flying in the atmosphere here is foreseen as 108.000 Km/Hour or 30.000 m/s. A material type and energy type that will reach this technological speed level in our world is not yet known. In the future, this situation can be solved with new technologies.

TYPE (R=-4) civilization technology level is the upper limit value in terms of vehicle speeds, technologies used and energy resources. With today's hydrocarbon energy sources, TYPE (R=-4) cannot exceed the civilization speed level. For this, both new science, new technology and new types of energy resources are needed for TYPE (R=-1, R=-2, R=-3) stages. The technology to use these energy sources will be very different from the materials and mechanical systems used today.

The leading technologies of reaching the speed of light will be in the TYPE (R=-3, R=-2, R=-1) order. In this order, the development of science and technology will be logarithmic. In other words, it will take a long time to go from TYPE (R=-3) to (R=-2)' level. Then it will take much longer time to pass to TIP (R=-1). Because this science technology is the leading science and technologies to reach the speed of light. There will be a situation where science is designed to reach the speed of light, but not realized due to technological and engineering problems. Theoretically, there will be many infrastructures. There should be other technological developments on top of this theoretical infrastructure so that the result can be achieved.

When the speed of light is reached, all kinds of science and technology known today will be in a very primitive state. In other words, today's civilization will be called the stone age civilization in the light speed period.

Communication systems and the speed of light in the civilization period, the technologies used today will definitely not be used. Many different technologies will be used in these systems. This era will also use technologies that are faster than the speed of light. The coding techniques used will be very different. Current supercomputers will use them as simple laptops in the future. Today's processor speeds and design will change. For these, the E1 energy level is the first true technology transformation point. This new science and technology will move the entire mechanical system speed to the speed of light. The change in this new technological transformation will also make the biggest changes in communication systems and computer technology. This rapid IT change will carry the mechanical speed to the speed of light, especially in technology. This speed will never be used in the Earth's atmosphere. Because our Earth is very small compared to the speed of light. For this reason, the speed of light and higher speeds will be used in extraterrestrial transportation systems. Another important result of this development is the better analysis of the structure of cells in the biological field, the production of artificial living organs, and then many systems we use will consist of biological organic structures. In this period, quantum biology and quantum synthetic biology will develop at an advanced level.

The processing speed of today's supercomputers has reached 1000 Petaflops. However, this number of operations is achieved by the operation of thousands of processors that perform parallel operations. The biggest problem of today's technology is that all processors used in computers still use digital signal processing technique. Such transactions slow down the processing speed. Instead, a new type of processing technology needs to be developed. The processing speed of computers is only achieved by increasing the number of processors and increasing the processor speed. It should be noted that the operating frequencies of all physical systems are a real physical barrier to the increase in processing speed. In this, systems that will work faster than the speed of light must be designed, and it is imperative to find new materials and materials, and to make new structural designs.

**TYPE(0): Light Speed Age**

TYPE(0) is the beginning of the light speed era or light speed civilization. E1, which heralds the future of the light speed civilization, is the time period when a new energy source is found and then the appropriate technology is developed. One of the important features of this phase is definitely the implementation of the new technology using the E1 new energy source. E1 energy source and technology will bring our world first to R=-3 science and technology civilization, then to R=-2 technology and civilization and then to R=-1 technology civilization. Progress will be gradual. As a result, R=0 light speed will reach the R=0 light speed level after a long time and many stages to reach the age of science and technology. The development of these stages will take place logarithmically. Science and technology development will reach through non-linear stages. There is a 10-fold difference between science and technology at R=0 and R=-1 stages. For this reason, in order to reach the R=0 light speed era, it is necessary to pass 10 times as much time as the science and technology at the R=-1 stage in science and technology, and the development of science and technology. The R=0 phase is not a simple phase, on the contrary, it will take a long time. Therefore, it will be very difficult to get to the R=0 stage in this R=-1 and it will take a very long time.

The TYPE R0 phase means rewriting the science. In other words, the philosophy of physics, chemistry, biology, materials, energy and science will be rewritten. Because the speed of light stage is theoretically difficult to exceed, or theoretically, some physicists define it as an impassable speed. This R=0 speed stage or TYPE(0) civilization stage will be the turning point for all science and technology. This stage will also form the theoretical and technological infrastructure of the TIP (1) and TIP (2) civilization stages in the next stages. At this stage, the details of the structure of matter will be learned more, and new elements that do not exist in our world will also be produced synthetically. The other can be made in pure substances consisting of sub-particles of atomic structures. These new substances will produce their own energy and will have the ability to obtain energy from all sources. Space vehicles will also be made of these new types of materials, and they will have features that will be able to produce their own energy and benefit from all kinds of energy.

Communication systems used today will not be used in the TIP(0) civilization stage. Today, the frequency problem that limits the bandwidth due to the physical structure of the material will be overcome. Individually, new internet and communication systems will be used and there will be no individual bandwidth problems. Today's technology would be considered so primitive as to be considered the Japanese Abacus spreadsheet in the TIP(0) era.

Today's science is developing in two areas. One of them is the fields of science and technology related to the structure of matter. It is the field of quantum or particle physics and chemistry, which is the area of interest of physics and chemistry. The other is biology, known as the representation of life. Due to the development of these two fields, it will also affect all applications of engineering fields. The other affects all areas of the health sector. In this period, these two fields of science will develop in a way that is unthinkable today. The number of unknown particles in the structure of matter and cell will decrease. There will also be new phases of matter. From these new phases, new materials that do not exist today will be made. Materials that are not affected by gravity and use other types of energy as energy that are not known by gravity will be made. Measurement in science Planck length will be considered as the basic unit of measurement

Wars in this period will be purely technological wars. Especially gunpowder and explosives today will never be used. Instead, weapons produced with high technology will be used. The speed of aircraft to be used in the military field will be higher than the speed of light. Because the speed of light will be the speed of standard aircraft.

The culture and civilization that people have established will develop very differently from today's civilization. Because the culture that will consist of tools, machines, electronic systems and computers that people use to make their lives easier will be civilization. Today, in the 19th, 20th and 21st centuries, there have been very fundamental inventions and inventions that have changed our culture and civilization. The main ones are automobiles, computers or IT and communication, in particular the internet and smart-phones. In this period, interstellar science, technology and culture change will be effective in the development and change of culture, the formation of religious understanding and social morality. In short, there will be sociological radical change and transformation in society.

Objects moving at the speed of light will be able to move in space during this period. This would be ordinary situations such as international travel today. People will now have joint business meetings by partnering with

businessmen from nearby planets and people will find jobs in these areas. Daily commute will be considered as an ordinary transportation. Today's tourism movements will now be between civilizations in the universe.

#### **TYPE (1):**

In the TIP(1) civilization stage, many subatomic particles in the structure of matter will be purified and solidified. After this purification, the production of new materials in the desired phase for very special purposes will also take place. In this period, the basis of new energy resources will be formed in the next period. In physics and chemistry, the chemical reaction will be carried out as desired, not only with electrons but with all subatomic particles. While these processes are being carried out, new energy sources will also be found. Thus, this period will also differ from the science and technology of the previous period. In the previous period, it was aimed only to reach the speed of light, but in this period, science and technology will be realized to reach the multiples of the speed of light. For this, new energy sources such as light obtained from particles faster than photons will be invented. In this period, materials will be converted to the desired phase without the need for large energy sources.

New phase types of matter and new forms of energy can be used. This new form may also be called quantum subradiation. For example, why not Hadron HASERS from Hadron radiations? [9]. Why not convert the new resource obtained to the desired phase? The action times of these particles are much lower than electrons and photons. It is said that there are many particles that the CERN atlas detector cannot detect. Or, who can say that there are no particles in their short intervals in time intervals that today's technology cannot measure? Or, apart from these, much faster radiation will be obtained by reaching more unknown sub-particles. Assuming that the speed of the Big-Bang explosion of our universe is as high as 1099 Km/s, it can be understood how low the speed of light is. A brand new communication system will also be realized from these very rapidly obtained particles. There will be no more bandwidth problems in communication systems. People will be able to make intergalactic communication as fast and comfortable as intercity communication.

It will be used in communication systems with new generation particles found in this period. Next generation particles will be used as signal beacons. In this case, the speeds of systems such as communication and computers will reach unimaginable levels today. This period will be the age of the particles of the Spooky quantum, where most of the unknowns that seem to be unknown secrets are now known [10-13]. These mysterious Spooky particles are transformed into all kinds of phases of matter. A new type of material consisting of only one particle will be produced. Spaceships will be built with these new materials. These ships will travel thousands of times faster than light and will generate their own energy.

Other important developments will be developments in the cell structure of biology. In this period, cell structure, DNA or structures in vitality measures will be known in great detail. Perhaps the diseases that we have not found a cure for today will be cured with a very simple treatment method. However, each period and each technology will have its own diseases. In other words, while technology treats old known diseases, new diseases will emerge. Again, health will be more dangerous for people than it is today. The reason for this will be the biological difference due to first planets and then intergalactic travel, and new diseases with the micro-livings carried. Maybe it will bring the end of people/or creatures on some planets. There may be intergalactic and interplanetary epidemics. Again, health will be a problem during this period.

In this age, with new scientific and technological breakthroughs, the Milky Way will now be our own world. In the Milky Way, interplanetary people will find jobs and work there. We will spend less time commuting to work than we spend most today in big cities. We will operate in the form of interplanetary home offices. We will use interplanetary money. Interplanetary currency rates and economic magnitudes will occur. With our new spacecraft, we will first reach the neighboring nearby galaxy, and then the scientific infrastructure will be formed to reach other galaxies. Towards the end of this era, there will be a new energy source that we call E2. With this energy source, systems that work much faster than the TIP(1) period will be built. So science and technology will change completely. TYPE(2) period will also start with the E2 new energy source.

#### **TYPE (2) Quantum entanglement era:**

The age of TYPE(2) civilization begins with the discovery of the E2 new energy type. The E2 new type of energy begins with the application of science and technology. We call this age the age of quantum entanglement. We give this name because of the quantum entanglement in the structure of matter. Today we use this name because of the existence of particles that move independently of speed, time and space. We call it this

way because the properties of subatomic particles cannot be determined exactly. As far as is known today, there is no concept of velocity, time-space during the entanglement of subatomic particles. In other words, it is accepted that conjugates exist in different places at the same time.

Particles interact instantaneously, regardless of the speed of interaction, time and space. In this age, with the spaceship systems to be made of these particles, all kinds of interplanetary living and non-living matter will be teleported. Spaceships and vehicles will be built from sub-particles of matter's atoms. These spaceships and vehicles will produce their own energy and there will be no energy problem. The most interesting aspect of this is that no matter how far away, instantaneous transportation will be instant intergalactic transportation. These subatomic particles will move with quantum entanglement velocity. For this reason, human teleportation and people's wandering in universes will take place in this way. Distance is no longer an issue. Light or any other speed is also not a problem. Health problems and diseases that arise only due to this rapid change will cause serious problems. Today, new diseases and epidemics that have never appeared yet will bring the threat of mass extinction. There will be great health problems due to the biological differences of living things between galaxies and universes. These problems will even lead to the extinction of all living things in stars, planets and galaxies. Human beings will reach this much speed and technology, but they will still not be able to prevent their own lineage from disappearing.

The other area is that in biology, in the structure of the cell, which is the basic building block of living things, secrecy will not remain to a large extent. Only the existence of organic subatomic particles and the DNA and other spiral codes of life will be largely deciphered. Human lifespan will be much longer. The brain and nervous system of organs in humans will be able to be regenerated. The information in the brains will be copied and transferred. The brain and spinal cord system will be able to be eaten with organ transplantation or new artificial ones.

As a result of the differentiation of ecological living species between universes, galaxies and planets, and the interaction of stars, planets and intergalactic living species, there will be the formation and differentiation of new types of hybrid living structures. Perhaps we will bring about our own demise by creating a new hybrid species that will bring the end of the human species and all other plants and creatures in our own world. In order to prevent this, we do not know what kind of changes will be made in the DNA structures, known as the living structures of today, and a new living and plant species will be made. There is only one known fact that our world is under threat during this period. It can be destroyed by more advanced civilizations in different ways at any time.

#### IV. CONCLUSION

This study has brought a different approach from previous civilization classifications. This new civilization type classification was made based on the speed of light. The speed of light per second is classified according to the light year and the speed of light multiples. While making this classification, they are defined as systems that move less than the speed of light. A curve is also given for these definitions in Figure.1. As can be seen from this curve, the center point of the curve is TYPE(0) or R=0 civilization and E0 energy level. This point represents the light speed level and light year level of civilization and technology. The other E1 and E2 are energy change points, radical change points in science and technology. The previous stages of the speed of light will never be reached before the E1 energy is reached. This stage is logarithmic, and changes in science and technology will also be logarithmic. When each improvement is 10 times the previous one, the next stage is passed. Reaching this speed of light will probably take a few hundred million years, depending on the current state of technology. According to these measures, our current technology level has been determined as R=-5 for objects flying in the atmosphere, R=-6 for land vehicles and R=-4 for extraterrestrial objects. We are at the R=-4 level in terms of communication systems and supercomputer systems.

When we start using the new E1 energy, we will also use new technologies. In this case, it will be 10 times more advanced than the previous level of science and technology. Another radical change in science and technology is that when we reach the R=0 civilization level, it will be at least 10 times more advanced than the science and technology of the previous E1 civilization. Then the E0 energy will be gradually passed. In this civilization, the upper limit of science and technology is up to E2 new energy source. In other words, it is the end of TYPE(1) civilization. It is also the beginning of the TYPE (2) civilization. In order for the TYPE(2) civilization to start, one must have E2 energy. If mankind cannot obtain the E2 new energy source, the next civilizational stage will never be reached. Or even if we have obtained the E2 energy source, if it cannot develop the technological use of the E2 energy and cannot produce the appropriate technologies, it still cannot pass to TIP(2) civilization.

The TYPE(2) civilization will be intergalactic and other inter-universe civilizations. After that, universes will be the era of interaction from intergalactic extraterrestrial sciences. Or we will jointly enter the new age of science and technology from intergalactic science, technology and culture exchanges. As cultures, a new sociological structure will develop. Depending on these, new civilizations will be formed. As these occur, new hostilities will also arise. So high-tech stars or galaxies will be able to destroy others. They will allow the transfer of science and technology, subject to the permission of other galaxies. This will raise the level of science and technology in our world or other stars. Or when we think of it as malicious, high-tech stars or galaxies will invade and destroy the living things of other undeveloped galaxies. As a result, every period has its positive and negative sides.

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