

Short Story
“My Universe”

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My Universe

It was raining. Raindrops were washing a small park and green trees were swaying under the stormy wind blowing. In a tiny corner of the small park, there was a small old bench. It stood under an old oak with broad branches which protected the bench from the rain. A man and a woman were sitting on the bench; they silently whispered something to each other... The sunset was blinding them with its glitter, covering the couple and the rain with the colours of a rainbow...

She bent over Him and whispered:

- You promised to write me letters...
- But I am here, beside You.

She exhaled. Embraced Him and closed her eyes. It seemed that everything was so far away...

It was an early morning, almost night. And she was feeling extremely happy, wishing to go to the park; but, before leaving, she opened a rusted mail box. A letter was there. She took it.

My Dear,

This is who You are to me. My Universe. Did You know that I do not know You at all? I was simply trying to pretend that I do... What should I compare You with? There is no ether! You run like the light, illuminating my life, You run at the enormous speed so no one can overtake... And never will! Sometimes I do not even know who You are. One time You seem to be like a wave; look how the light got brighter and then again disappeared! The other time I think that You are only a small persistent photon trying to remove me from my life... But I know one thing for sure: I need You.

She smiled. She understood everything what was written in that letter and it seemed so funny how a scientist's mind expressed what poets failed to find new words for, what songs could not fit new music to... She put the envelope in her pocket – because not all the answers must be given in that very moment. Sometimes one should wait until the proper time... She ran out of the house and, having jumped on a bike, rode to the park where she, after turning down one road out of many, met Him. She did not mention the letter... It seemed that a wonderful day was about to begin.

It was late in the morning, and He was intensively thinking. This has been lasting for several weeks. Still, this choice had to determine the entire life. How can they ask to decide in such a short time? Or maybe He had to think of this earlier? But back then He had no idea of the suggestion. Everything has changed so rapidly and many new opportunities awaited for him; it seemed that what was done before had no value now, and there will be not enough time to use all this... Hence, He held a letter and expected to find some answers and consolation there...

My Dear,

I know it is very hard for You... Let me bring some light to Your mind and soul. Do you know that what we are sorry about is also what we are glad for? What we are afraid urges us to move forward. Long time ago, when we were sitting in the park, it seemed to me that we were as if... As if in different Universes... And it was so scary to think that everything was not real. You know, today I

am a particle and I move in all possible trajectories, and every move that I make creates a million new Universes. But You are present in very few of them. I was so extremely fortunate to occur in the lucky Universe. The place where I was not alone. Perhaps somewhere, in other worlds, You have chosen in the right way... One way or another you will have made the right choice. Exactly now when everything is changing, a new point of view can give a possibility to perceive and experience the unimaginable things... Yes, somewhere it is simpler but here we are together. Even though we wished to have everything, what a crazy success it is!

He put the letter aside. Yes, She has always known how to calm Him down. At least a little bit.

Now, when the day was about to begin, it was Her favourite part of the day. When one feels the morning freshness but the sun is already shining. She was worrying. Worrying because new opportunities could be displayed for Her, yet She was afraid of them. Therefore, She did everything to avoid the further work. Today She had an excellent reason – a small sheet of paper with Her name written on it.

My Dear,

it seems that I have finally found what I was searching for. Sometimes it is so hard to see the truth, but, nevertheless, we believe in it. What is unknown to us is more than what is familiar to us. This dark matter which explains the expansion of the Universe and which is much more than the visible material, in fact, does not exist. But only what is unknown to us makes us expand out Universes, explore and get to know them... Now a part of the great secret is getting clearer for me, but You will always remain as my dark matter...

The letter had to calm down, but subdued spirits occupied Her without a reason... She attempted to ignore it. She had some work to be done.

He was sitting in silence by the table. Behind a dirty window the sun was shining. However, through a dust-covered window and smoke of factories, the light seemed little brighter than a lantern hanging outside! These are the roads led by choices. Wrong, improper choices. When one thinks going along the right way. Still, it has been an exceptional evening today. Exceptional because it was different from other days; He was holding something in His hand. A letter.

My Dear,

I know it is hard for You. But you should not feel upset. If it seems so bad it's never like it seemed from the very beginning! Even when it seems that the black hole has swallowed everything, it still radiates the particles... Even there where, it seems, nothing should exist, but something remains. There's always a hope. The hope always exists. Yes, these are just particles, but this is already a new beginning. But everything is not what it seems. I'm still inclined towards You, like a light bends besides the black hole...

He read all this for several times and exhaled. He remembered the day in the park... If then someone had told Him, so very much naïve, how everything would go on... That everything would evolve in that way, He would not believe it. He was so determined to strive for the dream, to

become someone great... And the same scientific tone that He was so proud of is imitated in this letter... She was always capable to reflect Him like a mirror. This tone reminded Him of who He was... As one action can ruin everything, in the same way another action perhaps may fix it?

It was in the afternoon, and the sun was shining hot. She was walking along the corridor. Or at least was trying to pace, because in fact She wanted to run out of impatience. If all this was the truth... The door is in front of Her. She stopped and tried to catch her breath. She straightened the dressing-gown and stepped inside. Yet there was nobody there. Just a few documents on the table. The anxiety rose in Her and very slowly She took a sheet of paper from the top of the pile. She carefully read it. Then repeated this again because She couldn't believe it. She consoled and supported Him when He was broken because of what had happened, what did to allow them to be together. Yes, it was hard for Him; in the beginning He even did not understand what She did, why She came to him. Of course, He saw no other side when She was sad and distressed, but everything passed away... She did not think this could happen to Her. After everything went so well and today had to be the day to change Her entire life. But now everything was ruined. The work of the life. She sat down because She could no longer control herself. Then She realised what useless her words were. And then She noticed the letter.

My Dear,

I know that the same has happen to You too. I cannot be sorry but I'm really very sad... Now everything seems so silly, doesn't it? Yet I do not blame... Empty words make no surprise, You could not know. And we are more an empty place than substance, even though it seems so strange. At least in this world! In each atom of You, just few electrons turn round a tiny nucleus, and the rest are just particles transmitting energy, they have almost no mass... Doesn't it remind you of the Universe? Diverse galaxies are scattered throughout the cosmos and they are getting more distant to each other... Like we too... What is the end? Will we become distanced below the reachable and die from loneliness, or maybe we will destroy each other? Perhaps this is not bound to happen... I wish to reach You so much, but You are too far... After all, I can't run faster than the light...

Right after finishing reading She noticed that the letter got wet; She promptly dried it. She understood what She had to do. To instantaneously tear the letter apart. To pretend that nothing has ever happened. She took the latter and tore it apart. This was one more ending of the Universe. The split. This is what she chooses. Only in the evening she understood that strange feeling. When sadness overcomes anger. But this should not happen in this way. She fell on her bed and ordered herself to sleep. Nevertheless, this order was not obeyed.

He did not open that letter for a long time because He was afraid of what He might find there. He was sitting in His modern laboratory and observing the sun getting pale. Everything has changed so much after the last time... He was afraid of what he might find because He felt that something that happened in the past had not disappeared. He could be reached by the radiation from the past time. He could record it, investigate, measure it by using His devices, to not completely perceive it but already know that all this has really happened. This was the scariest moment. However, a part of Him was striving out and shouting, reaching with hands. The postponing could not help. He opened the letter.

My Dear,

can I pretend that nothing has happened? This has been lasting for so long... And this was in the past... I have no time machine to travel and erase You out of my life. But no! No! It is more likely that I succeeded in decomposing You and describing each part of You to understand why it has happened, than destroyed You by my will. Because this is impossible. Too much of everything has happened. How should we behave? I just want You to explain me. To write me what has happened.

What has happened? He did not know it either. What has happened... Was it because of the research? Because the secrets of the Universe will belong to someone else? Which one will be honoured as a discoverer? It was not so easy. And He understood that He would not be able to answer this letter. Because He had nothing to answer in reply.

Everything was alright. When the evening closes in, one inevitably starts thinking of what is awaiting. If the death will be as beautiful as the sunset, let it be! It seemed to Her that She had done everything She had to. What She could. She did not feel completely happy, but this did not depend on Her anymore. Everything was alright when a doorbell rang. It was a postman bringing Her a letter. He said it was urgent. Her hands were trembling as she took the letter. She recognised the handwriting at once. Presently, Her hands were always shaking because of the old age; but this time She was sure that the reason was different. When She held enough courage to take a glance inside She was surprised. So very little was written in that letter.

My Dear,

come to the park.

If she was pondering She would have never walk there. But instinctively She took a bike and, even though she had not been riding a bike for many years and the very ride was really a test to Her, now She wanted to ride at the speed of the light. She could wait no longer. After all, a moment comes when one forgets everything. All that has happened becomes insignificant because one understands that ambitions, envy or anger are trifles. Sometimes there are no explanations, no events – just their interpretations; sometimes one knows only fragments of them and the meanings should be found out applying own endeavours. Usually, there is no ending too; the real thing is what we create ourselves. This would happen in Her research and Her life.

It was raining. Raindrops were washing a small park and green trees were swinging under a stormy wind. In the corner of that small park a small bench stood. It was located under an old branchy oak covering it from the rain. And a man was sitting on that bench. When She came closer She did not how to behave... The setting sun was blinding, embracing them and the rain with colours of a rainbow...

She leaned to Him and whispered:

- You promised me to write letters.

He handled a sheet of paper to Her.

*My Dear,
This is what You are to me. My Universe.*

She smiled. She embraced Him and closed Her eyes. It seemed that everything was so distant from here...

Annex

Scientific reasoning for the short story “My Universe“

My short story discusses several key laws of physics related to the Universe.

The first letter mentions ether, i.e. the material that fills in the Universe and, regarding it, speeds of other solids can be measured; scientists of the 19th century believed in it. This idea was rejected by A. Einstein in 1905 when he, on the ground of earlier discoveries, such as Maxwell’s equation and Michelson-Morley experiment, announced that the speed of light was constant, independently from observers moving in regard to the ether. In such a case, the notion of ether became unnecessary. Existence of the speed of light as the highest possible speed at which energy, material and information can travel, proven by A. Einstein’s special theory of relativity. In 1873, Maxwell announced the equations grounding that the light was electromagnetic waves and interference proving it was a phenomenon of when two or several coherent waves moving in the space compound and this way form changing light and dark stripes in a row. This phenomenon was investigated by scientists Fresnel and Young. Meanwhile, M. Planck maintained that the source of light radiated light not all the time but in certain portions – quanta. A quantum can be treated as a specific particle of light – a photon. This reveals the nature of the light as consisting of a flow of particles.

The second letter discusses the theory of multiple universes. This theory is based on the Feynman’s conclusion made when investigating the double split experiment: during the experiment particles, basing on Heisenberg’s quantum uncertainty principle, cannot have a particular trajectory; therefore, Feynman proposed a mathematical expression showing that particles travel in all trajectories at a time, i.e. Feynman’s summing up by trajectories. Some scientists, such as Stephen Hawking, draw a conclusion that if we treat all events taking place in the Universe (including its emergence) as quantum events and will apply Feynman’s theory to them, then we will obtain that each event creates new Universes. However, this theory has no sufficient proofs and therefore is open for a discussion.

The third letter refers to the dark matter which is the substance that does not radiate or reflect electromagnetic waves. Fritz Zwicky was the first to face the problems of the mass shortage; in 1933 he noticed the lack of material in the constellation of Coma Berenice. The dark matter can explain why the Universe is flat (this has been proven by investigations on WMAP relic radiation). Nevertheless, this idea was criticised. George Ellis, Charles Hellaby and Nazeem Mustapha worked out a theory stating that we live in an empty part of the Universe, therefore, the amount of matter composing the Universe has been wrongly calculated.

The fourth letter deals with the black holes. It mentions the radiation of particles, i.e. Hawking radiation proposed and theoretically grounded by S. Hawking in 1974. This radiation is based on the fact that in vacuum a particle and its anti-particle can independently form for a short time and

instantly disappear. If this happens at the boundary with the black hole, one of the particles can fall into the hole and the second can be blown up into the cosmos creating radiation. A. Einstein held it that in the gravitational field photons of light move in a curved trajectory because the mass makes the time-space curved. He proved the impact on the time-space in 1915, and in 1919 a small deviation of star's ray was noticed and, thus, this theory was proven practically. As the black hole is an object of enormous mass, it not only curves the light near it but also absorbs it.

The fifth letter writes about the structure of an atom and endings of the Universe. A nucleus makes up one millionth part of atom's size. This was found out in 1910 by Rutherford. Atom's structure is maintained by the electromagnetic and strong interactions. Electromagnetic interaction exists between atom's nucleus and electrons; in the quantum theory of the field, a mass-free boson, i.e. photon, is a carrier of electromagnetic interaction. Electromagnetic interaction is one of the expressions of the electroweak concept. In 1979, Steven Weinberg and his team were awarded the Nobel Prize in Physics for this discovery. The strong interaction is the interaction between protons and neutrons as well as quarks forming them. It is transmitted by mass-free gluons. Features of existence of gluons were traced for the first time in 1979 in the PETRA particles accelerator. Several possible endings of the Universe have been singled out. They depend on the impact of the mass density and the dark energy, i.e. the energy which is the opposite to gravitation and explaining the expansion of the Universe which has been proven by WMAP observation carried out by NASA, published in 2003. If the density of the Universe mass-energy is equal to the critical or less and if the impact of the dark energy is the same, then the Universe will expand further on until faces the Cold Death. It would be faced also after exhausting resources of hydrogen. This idea was suggested by Lord Kelvin. If the impact of the dark energy will grow stronger, then it will become stronger than other forces and will completely resolve the Universe. A scientist R. Caldwell is a supporter of this theory. If the density of the Universe is higher than critical, gravitation forces will finally stop its expansion and the Great Collapse and Contraction will take place. This is based on the universal Einstein's theory of relativity.

The sixth letter mentions the impossibility to describe each particle. This is based on Heisenberg's uncertainty principle stating that high-frequency waves more strongly disturb the speed of a particle; but they are shorter, therefore, it is possible to estimate the position of a particle. Because of this reason, it is impossible to exactly estimate both particle's speed and location.