



Origins of the Universe:
Kabbalah and Physics in Dialogue

A 4 Part Series
Tuesdays at Noon
June 2020

A brief look and Zoom information in this brochure

Recent articles in the NYTimes have re-ignited conversations about the mysteries of the universe. Two young scholars, both of whom grew up at Kol Ami, lead us in four June sessions on the **Origins of the Universe: Kabbalah and Physics in Dialogue**.

Celebrate the month of June with spectacular learning.

Yours,
Rabbi Shira Milgrom

MEET OUR TEACHERS

Sam Kohn has always wondered why things are the way they are, and how they came to be. He grew up in Scarsdale, NY, and received a BA from Columbia and an MA from UC Berkeley, both in physics. He is currently pursuing a PhD in particle physics at UC Berkeley, which he expects to receive this year. When he is not working on his dissertation, Sam can be found organizing his grad student co-workers as a union steward with UAW Local 2865 and building civic engagement in the Bay Area as a founder and lead organizer of Indivisible Berkeley.

In high school, Yaron Milgrom discovered the bookshelf on Kabbalah among his parents extensive Jewish library and he immediately was drawn to the bold questions and daring answers derived from ancient texts. After study in Israel, Yaron pursued Jewish mysticism through college and graduate school, cutting his doctorate short to pursue local and sustainable food entrepreneurship in San Francisco. Now, his library of Kabbalist literature fills the shelves above the books of his three children.

June 2nd

12:00-12:45pm

Sam Kohn

Particle physics and the origins of the universe: Introducing basic concepts and terminology

June 9th

12:00-12:45pm

Yaron Milgrom

Kabbalah (Jewish mysticism) and the origins of the universe: Introducing basic concepts and terminology

June 16th

12:00-1:30pm

Sam Kohn and Yaron Milgrom

Particle physics and Jewish mysticism in dialogue: Part I

June 23rd

12:00-1:30pm

Sam Kohn and Yaron Milgrom

Particle physics and Jewish mysticism in dialogue: Part II

Shira Milgrom is inviting you to:

Kabbalah and Physics in Dialogue

Zoom link: [Click here](#)

Meeting ID:

847 9349 0940

Password: 3ff9NY

By phone:

1-646-876 -923

Meeting ID:

847 9349 0940

Password: 500348

Our teachers will be referencing the following materials during the four June sessions

nature > news & views > article

nature

Sourced from: <https://www.nature.com/articles/d41586-020-01000-9>
Click the link to read the full article

NEWS AND VIEWS · 15 APRIL 2020

Matter–antimatter symmetry violated

In a mirror world, antiparticles should behave in the same way as particles. But it emerges that leptons – neutrinos, electrons and their more exotic cousins – might not obey this expected pattern.

Silvia Pascoli  & Jessica Turner

All visible matter in the Universe is made of fundamental building blocks, the elementary particles. The group of particles known as fermions consists of two types: quarks, which make up protons and neutrons; and leptons, namely, the electron, muon, tau particle and neutrino. For each elementary particle, there is an antiparticle that has the same properties but opposite charge. The best-known example is the antielectron, or positron. It was long thought that antiparticles would behave in the same way as particles in a mirror world made of antimatter, but since the 1960s we have known that quarks and antiquarks break this particle–antiparticle mirror symmetry^{1,2}. Writing in *Nature*, the T2K Collaboration reports possible findings of violation of this symmetry by leptons³.

Particle–antiparticle mirror symmetry is also known as charge-conjugation parity-reversal (CP) symmetry; it combines the charge symmetry between particles and their antiparticles with parity (the idea that physical laws should not change in an antimatter mirror world). Why is CP symmetry broken, and what are its consequences? This puzzling question lies at the core of our understanding of the laws of nature and the evolution of the Universe.

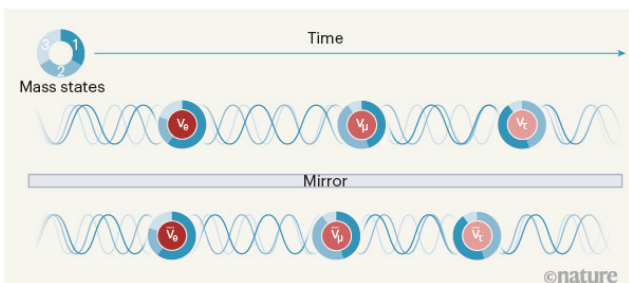


Figure 1 | Neutrinos through the looking glass. The elementary particles known as neutrinos have a curious ability to transform between three flavours (ν_e , ν_μ and ν_τ) over time, because the three components (mass states) of their make-up evolve differently; waves are simplified depictions of the contribution of each mass state to the neutrino. Each neutrino type has its own antineutrino (indicated by a bar). Symmetry rules imply that, in a mirror world made of antimatter, the antineutrinos should behave like neutrinos. But results from Japan's T2K experiment indicate that this symmetry might be broken³. The result could hint at how the Universe came to contain more matter than antimatter.

OUT THERE

Why the Big Bang Produced Something Rather Than Nothing

How did matter gain the edge over antimatter in the early universe? Maybe, just maybe, neutrinos.



By **Dennis Overbye**

Published April 15, 2020 Updated April 27, 2020

Scientists on Wednesday announced that they were perhaps one step closer to understanding why the universe contains something rather than nothing.

Part of the blame, or the glory, they say, may belong to the flimsiest, quirkiest and most elusive elements of nature: neutrinos. These ghostly subatomic particles stream from the Big Bang, the sun, exploding stars and other cosmic catastrophes, flooding the universe and slipping through walls and our bodies by the billions every second, like moonlight through a screen door.

Neutrinos are nature's escape artists. Did they help us slip out of the Big Bang? Perhaps. Recent experiments in Japan have discovered a telltale anomaly in the behavior of neutrinos, and the results suggest that, amid the throes of creation and annihilation in the first moments of the universe, these particles could have tipped the balance between matter and its evil-twin opposite, antimatter.

As a result, a universe that started out with a clean balance sheet — equal amounts of matter and antimatter — wound up with an excess of matter: stars, black holes, oceans and us.

Sourced from:

<https://www.nytimes.com/2020/04/15/science/physics-neutrino-antimatter-ichikawa-t2k.html>

Click the link to read the full article

Talmudic Passages

Babylonian Talmud Hagigah 14b - 15b. Copied from Sefaria.

The Gemara returns to the topic of the Design of the Divine Chariot. **The Sages taught: An incident occurred involving Rabban Yoḥanan ben Zakkai, who was riding on a donkey and was traveling along the way, and his student, Rabbi Elazar ben Arakh, was riding a donkey behind him. Rabbi Elazar said to him: My teacher, teach me one chapter in the Design of the Divine Chariot. He said to him: Have I not taught you: And one may not expound the Design of the Divine Chariot to an individual, unless he is a Sage who understands on his own accord? Rabbi Elazar said to him: My teacher, allow me to say before you one thing that you taught me.** In other words, he humbly requested to recite before him his own understanding of this issue. **He said to him: Speak.**

Immediately, Rabban Yoḥanan ben Zakkai alighted from the donkey, and wrapped his head in his cloak in a manner of reverence, and sat on a stone under an olive tree. Rabbi Elazar said to him: My teacher, for what reason did you alight from the donkey? He said: Is it possible that while you are expounding the Design of the Divine Chariot, and the Divine Presence is with us, and the ministering angels are accompanying us, that I should ride on a donkey? Immediately, Rabbi Elazar ben Arakh began to discuss the Design of the Divine Chariot and expounded, and fire descended from heaven and encircled all the trees in the field, and all the trees began reciting song.

What song did they recite? "Praise the Lord from the earth, sea monsters and all depths...fruit trees and all cedars...praise the Lord" (Psalms 148:7–14). An angel responded from the fire, saying: This is the very Design of the Divine Chariot, just as you expounded. Rabban Yoḥanan ben Zakkai stood and kissed Rabbi Elazar ben Arakh on his head, and said: Blessed be God, Lord of Israel, who gave our father Abraham a son like you, who knows how to understand, investigate, and expound the Design of the Divine Chariot. There are some who expound the Torah's verses well but do not fulfill its imperatives well, and there are some who fulfill its imperatives well but do not expound its verses well, whereas you expound its verses well and fulfill its imperatives well. Happy are you, our father Abraham, that Elazar ben Arakh came from your loins.

The Gemara relates: **And when these matters, this story involving his colleague Rabbi Elazar ben Arakh, were recounted before Rabbi Yehoshua, he was walking along the way with Rabbi Yosei the Priest. They said: We too shall expound the Design of the Divine Chariot. Rabbi Yehoshua began expounding. And that was the day of the summer solstice, when there are no clouds in the sky. Yet the heavens became filled with clouds, and there was the appearance of a kind of rainbow in a cloud. And ministering angels gathered and came to listen, like people gathering and coming to see the rejoicing of a bridegroom and bride.**

The Sages taught: Four entered the orchard [pardes], i.e., dealt with the loftiest secrets of Torah, and they are as follows: Ben Azzai; and ben Zoma; Aḥer, the other, a name for Elisha ben Avuya; and Rabbi Akiva. Rabbi Akiva, the senior among them, said to them: When, upon your arrival in the upper worlds, you reach pure marble stones, do not say: Water, water, although they appear to be water, because it is stated: "He who speaks falsehood shall not be established before My eyes" (Psalms 101:7).

The Gemara proceeds to relate what happened to each of them: **Ben Azzai glimpsed** at the Divine Presence **and died. And with regard to him the verse states: "Precious in the eyes of the Lord is the death of His pious ones"** (Psalms 116:15). **Ben Zoma glimpsed** at the Divine Presence **and was harmed**, i.e., he lost his mind. **And with regard to him the verse states: "Have you found honey? Eat as much as is sufficient for you, lest you become full from it and vomit it"** (Proverbs 25:16). **Aḥer chopped down the shoots of saplings.** In other words, he became a heretic. **Rabbi Akiva came out safely.**

§ The Gemara stated earlier that **Aḥer chopped down the saplings**, becoming a heretic. **With regard to him, the verse states: "Do not let your mouth bring your flesh into guilt" (Ecclesiastes 5:5).** The Gemara poses a question: **What was it that led him to heresy? He saw the angel Mitatron, who was granted permission to sit and write the merits of Israel. He said:** There is a tradition that in the world above there is no sitting; no competition; no turning one's back before Him, i.e., all face the Divine Presence; and no lethargy. Seeing that someone other than God was seated above, **he said: Perhaps,** the Gemara here interjects, **Heaven forbid, there are two authorities,** and there is another source of power in control of the world in addition to God. Such thoughts led *Aḥer* to heresy.

The Gemara relates: **They removed Mitatron** from his place in heaven **and smote him with sixty rods [pulsei] of fire**, so that others would not make mistake that *Aḥer* made. **They said** to the angel: **What is the reason that when you saw Elisha ben Avuya you did not stand before him?** Despite this conduct, since Mitatron was personally involved, he **was granted permission to erase the merits of Aḥer** and cause him to stumble in any manner. **A Divine Voice went forth saying: "Return, rebellious children" (Jeremiah 3:22), apart from Aḥer.**

אמר רבא אי בעו צדיקי ברו עלמא שנאמר כי עונותיכם היו מבדילים וגו'

Rava says: If the righteous wish to do so, they can create a world, as it is stated: "But your iniquities have separated between you and your God." In other words, there is no distinction between God and a righteous person who has no sins, and just as God created the world, so can the righteous.

רבא ברא גברא שדריה לקמיה דר' זירא הוה קא משתעי בהדיה ולא הוה קא מהדר ליה אמר ליה מן חבריא את הדר לעפריך

Indeed, **Rava created a man**, a golem, using forces of sanctity. Rava **sent** his creation **before Rabbi Zeira.** Rabbi Zeira **would speak to him but he would not reply.** Rabbi Zeira **said to him: You were created by one of the members of the group, one of the Sages. Return to your dust.**

רב חנינא ורב אושעיא הוו יתבי כל מעלי שבתא ועסקי בספר יצירה ומיברו להו עיגלא תילתא ואכלי ליה

The Gemara relates another fact substantiating the statement that the righteous could create a world if they so desired: **Rav Ḥanina and Rav Oshaya would sit every Shabbat eve and engage in the study of Sefer Yetzira, and a third-born calf [igla tilta] would be created for them, and they would eat it** in honor of Shabbat.

From Maimonides Guide to the Perplexed (Pines translation)

I:60, p. 143-4

Assume that a man has acquired true knowledge regarding the existence of a ship, but does not know to what it is that the term is applied: namely, whether it is applied to a substance or to an accident; afterwards it became clear to yet another individual that it is not a mineral; then it became clear to someone else that it is not a living being; then it became clear to someone else that it is not a plant forming a continuum with the earth; then it became clear to someone else that it is not a one body natural forming a continuum; then it became clear to someone else that it does not possess a simple shape as do tables and doors; then it became clear to someone else that it is not a sphere, and to another individual that it is not spherical and not possessed of equal sides, and to someone else again that it is not solid all through. Now it is clear to that the last individual has nearly achieved, by means of these negative attributes, the representation of the ship as it is. He has, as it were, attained equality with one who has represented the ship as being a body consisting of timber, a body that is hollow, oblong, and composed of a number of pieces of timber; that is, he has attained equality with one who has represented the ship by means of affirmative attributions....Accordingly the negative attributes make you come nearer in a similar way to the cognition and apprehension of God, may He be exalted.

I:60, p. 146

In accordance with this elucidation you shall know that he is incapable of apprehending the deity and is far removed from knowledge of Him....As for one who affirms an attribute of Him without knowing a thing about it except the mere term....An example is that of a man who had heard the term elephant and knows that it is an animal and demands to know its shape and true reality. Thereupon one who is himself mistaken or who misleads others tell him that it is an animal possessing one leg and three wings, inhabiting the depths of the sea, having a transparent body and a broad face like that of man in its form and shape, talking like a man, and sometimes flying in the air, while other times swimming like a fish. I will not say that this representation of the elephant differs from what there latter really is, nor that the man in questions falls short of his apprehension of the elephant. But I shall say the thing to he has imagined as having those attributes is merely an invention and is false and there is nothing in existence like that.⁶⁰

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Other biblical passages you may wish to read before the sessions begin:
Genesis 1-3, Exodus 33:12-23, Ezekiel 1, Isaiah 6, Daniel 7