

<https://www.quantamagazine.org/will-we-ever-prove-string-theory-20250529/>

But What Actually Is a Particle? How Quantum Fields Shape Reality


Ale co je to vlastně částice? Jak kvantová pole utvářejí realitu.



[Physics Explained](#)

267 tis. odběratelů

30,141 views **14. 6. 2025** I opened on 15.06.2025 and...and there were already 30 thousand views, in one day. - - I have 30,000 views in about 16.5 years.

Thanks to Brilliant for sponsoring this video! Try Brilliant free for 30 days and get 20% off an annual premium subscription by following the link  <https://brilliant.org/PhysicsExplained/>

You can help support this channel via the Physics Explained Patreon: 

[/physicsexplained](#) But what actually is a particle? When we talk about electrons, quarks, or photons — what are we really talking about? In this video, we take a journey from simple harmonic motion to quantum fields, uncovering the deep mathematical structure that underpins modern physics. We begin with the physics of vibrations and waves, showing how the classical picture leads naturally to fields. From there, we explore what happens when quantum mechanics enters the picture, and how quantising a relativistic field leads to the profound insight that particles are simply the smallest possible vibrations of these fields. References and Further Reading: No-Nonsense QFT – Jakob Schwichtenberg An excellent and intuitive introduction to the modified wave equation (Klein–Gordon equation), using a spring mattress analogy. Accessible and highly recommended for those interested in how it emerges from classical mechanics via Lagrangian methods. Of Particular Significance (Blog) – Matt Strassler A superb blog that explores many of the same foundational ideas covered in this video, and goes further into topics like field interactions and the Higgs mechanism. Insightful and highly readable. Quantum Field Theory for the Gifted Amateur – Tom Lancaster & Stephen J. Blundell A superb, detailed, and well-written introduction. Best suited for those willing to put in the work — but very accessible compared to more advanced texts. Quantum Field Theory Lecture Notes – David Tong A more advanced but beautifully written set of lecture notes from Cambridge. Highly recommended for deeper study. Quantum Field Theory – Lewis H. Ryder A clear and concise graduate-level textbook. Especially good for building physical intuition and understanding the structure of relativistic field theory. Quantum Field Theory – Mark Srednicki A modern and comprehensive text widely used in graduate courses. Demanding but rewarding, and an excellent long-term reference. You can

follow me on Instagram:  [/physics_explained_ig](#) You can follow me on X (Twitter):



[/physicsexplain1](#)

But what exactly is a particle? How quantum fields shape reality. A particle of matter is a ball of space-time dimensions. <https://www.hypothesis-of-universe.com/index.php?nav=ea> ;

<https://www.hypothesis-of-universe.com/index.php?nav=c> ; https://www.hypothesis-of-universe.com/docs/c/c_281.jpg ; https://www.hypothesis-of-universe.com/docs/c/c_282.jpg ; https://www.hypothesis-of-universe.com/docs/aa/aa_488.pdf

Physics Explained 267k subscribers 30,141 views 6/14/2025 Thank you Brilliant for sponsoring this video! Try Brilliant for free for 30 days and get 20% off a one-year premium subscription by clicking the link  <https://brilliant.org/PhysicsExplained/> You can support this channel through the Physics Explained Patreon: /physicsexplained

But what exactly is a particle? When we talk about electrons, quarks or photons – what are we really talking about? An elementary particle of matter is a packed ball of dimensions, a package of 3+3 physical dimensions packed together – in short. In an abstract demonstration https://www.hypothesis-of-universe.com/docs/c/c_416.jpg

In this video, we take a journey from simple harmonic motion to quantum fields and uncover the deep mathematical structure that underlies modern physics. We start with the physics of vibrations and waves and show how the classical picture naturally leads to fields.

We will then explore what happens when quantum mechanics comes into play, and how quantizing relativistic fields leads to the profound insight that particles are simply the smallest possible vibrations of these fields. Now you are close enough to how vibrations of dimensions can be "balled up" and float in fields. <https://www.hypothesis-of-universe.com/index.php?nav=ea> ; Links and more: Practical Quantum Field Theory – **Jakob Schwichtenberg** An excellent and intuitive introduction to the modified wave equation (Klein-Gordon equation) using the spring mattress analogy. Accessible and highly recommended for those interested in how emerges from classical mechanics using Lagrangian methods. Special significance (Blog) – **Matt Strassler**. Excellent blog that explores many of the same basic ideas covered in this video, and goes on to cover topics such as field interactions and the Higgs mechanism. Engaging and easy to read. Quantum Field Theory for the Gifted Amateur - **Tom Lancaster and Stephen J. Blundell**.

An excellent, detailed and well-written introduction. Best suited to those willing to put in the work - but very accessible compared to more advanced texts. Quantum Field Theory Lecture Notes - **David Tong**. A more advanced but beautifully written set of Cambridge lecture notes.

Highly recommended for deeper study. Quantum Field Theory - **Lewis H. Ryder** A clear and concise textbook for graduate students. Particularly useful for building a physical intuition and understanding the structure of relativistic field theory. Quantum Field Theory - ***Mark Srednicki*** A modern and comprehensive text widely used in graduate courses. Challenging, yet rewarding, and an excellent long-term resource. You can follow me on Instagram: /physics_explained_ig You can follow me on X (Twitter): /physicsexplain1.

.....
I'm your host, **Janna Levin**. If you have any questions or comments for us, please email us at quanta@simonsfoundation.org Thanks for listening →

← I'm your host, **Janna Levin**. If you have any questions or comments, please email us. ****I have hundreds, I have thousands of questions, notes, comments, and ideas, and ... and I've been sending them to physicists (who are intellectuals!, aren't they) all over the world for 25**

years, but I never get any feedback..., not even whether they read my opinions...or that they even tried to read them... (I recommend that those who are determined to read from the youngest texts to the oldest texts) please email us at quanta@simonsfoundation.org. Thank you for listening.

Josef Navrátil, Česká Kamenice, CZ, 02.07.2025 ; j_navratil@volny.cz ;
<https://www.hypothesis-of-universe.com/en/index.php?nav=home> ;

I wrote to them and there was no answer until today 22.02.2026