

Science detects them in ice.

We put them to work in a device.

IceCube registers single neutrino events in a cubic kilometre of Antarctic ice. The Neutrino Power Cube, developed by Neutrino® Energy Group, goes after usable electrical power through neutrinovoltatics, a multichannel approach that couples five ambient inputs. Two cubes, two questions, one drive: to open up the invisible.

Neutrino® Energy Group | October 2026



Visualisation. The detector volume of IceCube, about one cubic kilometre of ice, drawn as a cube beside the Neutrino Power Cube, which measures about $800 \times 400 \times 600$ millimetres.

The two are not shown at true scale.

What would you have to build to watch something that passes through the whole planet without leaving a trace?

Patience, for a start. And a great deal of clear, undisturbed matter, because a particle that ignores almost everything only gives itself away when you offer it almost everything to ignore. The researchers at the South Pole took the plainest material they could find, Antarctic ice, and used about a cubic kilometre of it. They melted holes more than two kilometres deep, lowered thousands of light sensors into them, and waited for the dark to flicker.

On 6 October 2026 the Royal Swedish Academy of Sciences awarded the Nobel Prize in Physics to Francis Halzen, the Belgian-American physicist at the University of Wisconsin-Madison who led the IceCube project as its principal investigator. The prize recognises decisive contributions to the IceCube Neutrino Observatory and the discovery of high-energy neutrinos of astrophysical origin. It rests on the work of a large international collaboration. We congratulate Halzen and everyone who spent decades in the cold and in the data to earn it.

Two cubes now share a headline, and they ask different things. IceCube asks what neutrinos can tell us about the universe. The Neutrino Power Cube, a compact unit that Neutrino® Energy Group is developing on the basis of neutrinovoltaics, asks how invisible energy inputs can be opened up for electrical supply. That is what the headline means. “Them” isn’t neutrinos caught and stored, because nothing catches a neutrino. It’s the energy that rare interactions, together with four other ambient inputs, can hand to an engineered layered material. We intend to put that energy to work.

Two cubes. Two tasks. One drive: to open up the invisible.

The cubes share a shape and a fascination. They don’t share an organisation. IceCube is an independent international research collaboration. The Neutrino® Energy Group is not part of it, and the Power Cube is not a further development of the IceCube detector.

Neutrinos gave our research direction its name. Our technical approach is broader: it investigates several energy channels. We build technology, and we mean to build it at industrial scale. This article follows the road from a mathematical idea to a device you can plug a load into.

Who explains what. Two voices from the Neutrino Engineering District will accompany you. Avery Laurent and Morgan Elia are AI personalities, and they’re presented here as

such. Avery brings the scientific fascination: interactions, materials, the mathematical description and the experimental checks. Morgan brings the entrepreneurial drive: system requirements, development, manufacturing and the road to industry. Their statements rest on the sources listed at the end.

How Does IceCube Make a Single Event Visible?

Nothing in a neutrino interaction can be seen directly, so IceCube watches what comes after it.

Now and then a neutrino interacts with an atomic nucleus in or near the ice, through the weak force. The nucleus breaks apart into charged particles, and a muon neutrino also turns into a muon. These charged secondary particles fly on at almost the speed of light. In ice, light itself travels more slowly than that. A charged particle that outruns light in a medium trails a cone of faint blue glow behind it, the optical cousin of a sonic boom. It's called Cherenkov light.

The sensors hang on vertical strings through the deep ice: about 5,160 of them, between roughly 1,450 and 2,450 metres below the surface, with the upper ice left empty. The depth is deliberate. Down there the pressure has squeezed out the air bubbles, and the ice is exceptionally clear. Each sensor records when light arrives and how much. From the pattern across hundreds of sensors, timed to billionths of a second, researchers work out the direction the particle came from and roughly how much energy it carried.

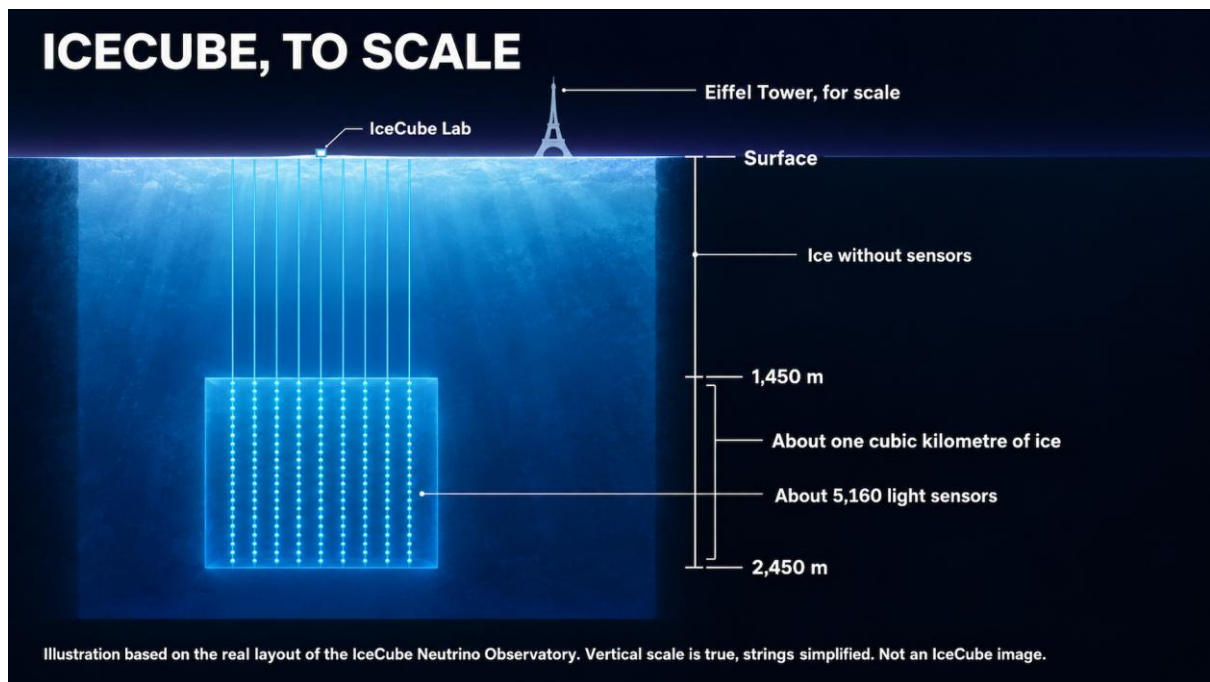
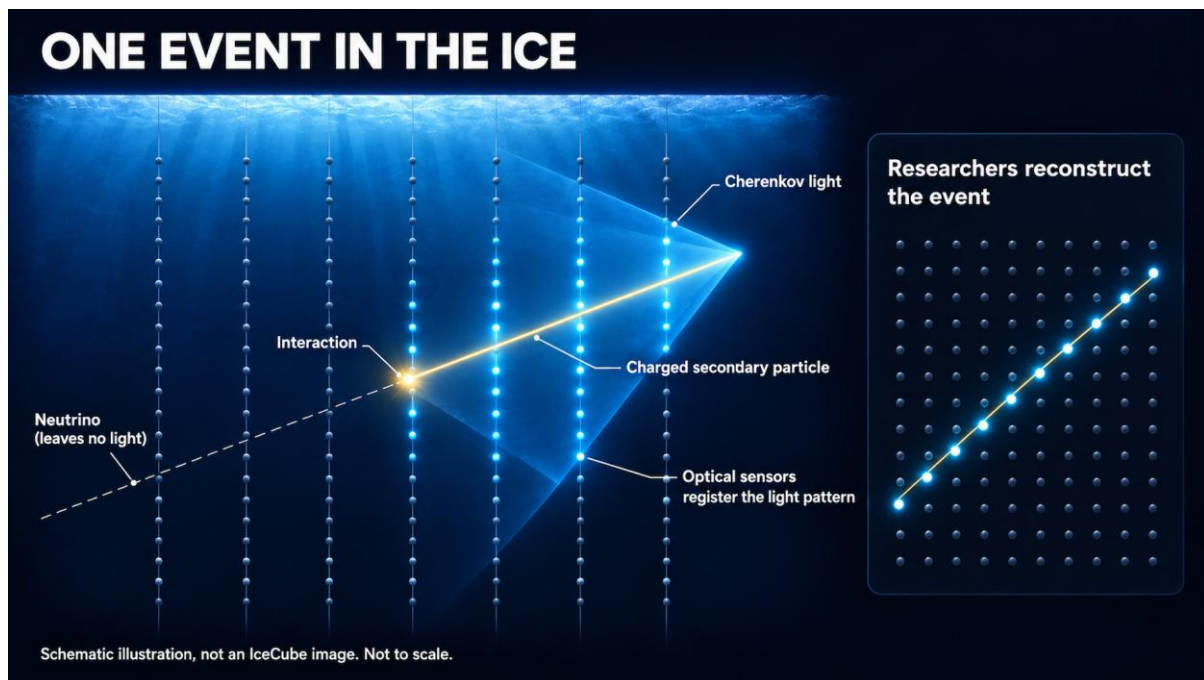


Illustration based on the real layout of the IceCube Neutrino Observatory. The sensors sit between 1,450 and 2,450 metres below the surface, in ice that has squeezed out its air bubbles. Vertical scale is true, strings are simplified. How a sensor there turns a single event into a signal is shown next.

Avery: What I love about this instrument is how modest it is. Thousands of sensors sit in the dark for years so that a flash lasting billionths of a second can be read like a fingerprint.

Halzen proposed in 1988 that the South Pole ice itself could be the detector. It took years of work, from the pilot instrument AMANDA to the finished IceCube in 2011, to prove the point.

The light is the easy part. The noise is hard. Particles from cosmic-ray showers in the atmosphere produce muons in the ice that far outnumber genuine neutrino events, a bit like trying to hear one faint station in a room full of static. So researchers favour neutrinos that have come up through the planet, whose path through the Earth has filtered out nearly everything else, and they apply strict statistical tests before they call anything a signal.



Schematic illustration based on the real detector layout, not an IceCube image. A neutrino is invisible. The sensors register the faint blue light of the particles created in a rare interaction, and from its pattern researchers reconstruct where the event came from. But what about the particles that pass through without a trace?

What Did the Nobel Prize Recognise?

The prize recognises something concrete: the first reliable detection of neutrinos with very high energies that come from beyond our solar system. In 2013 IceCube reported a small set of such events that the atmosphere couldn't explain. In 2018 a neutrino recorded the previous September was traced to a flaring galaxy called TXS 0506+056, which telescopes had also seen in light, and a neutrino pointed to a specific source for the first time. In 2023 the collaboration reported neutrinos from the plane of our own Milky Way.

Why does that widen our view of nature? For most of history we looked at the universe with light, and light gets absorbed, scattered and bent on its way. Neutrinos cross dense regions and magnetic fields almost undisturbed and arrive pointing back at where they were made. They carry news from places that light can't leave.

The questions that follow are large. Victor Hess measured cosmic rays in 1912, and where the most energetic of them come from has been open ever since. Which objects accelerate

particles to such energies, and how? What do the highest-energy neutrinos reveal about physics at energies no laboratory can reach? A good day for a field that spent decades building patience into an instrument is a good day for anyone curious about physics, and we count ourselves among them.

Why Can Neutrinos Pass Through Almost Everything?

Tens of billions of solar neutrinos cross a thumbnail every second. You feel none of them, and nothing about you changes.

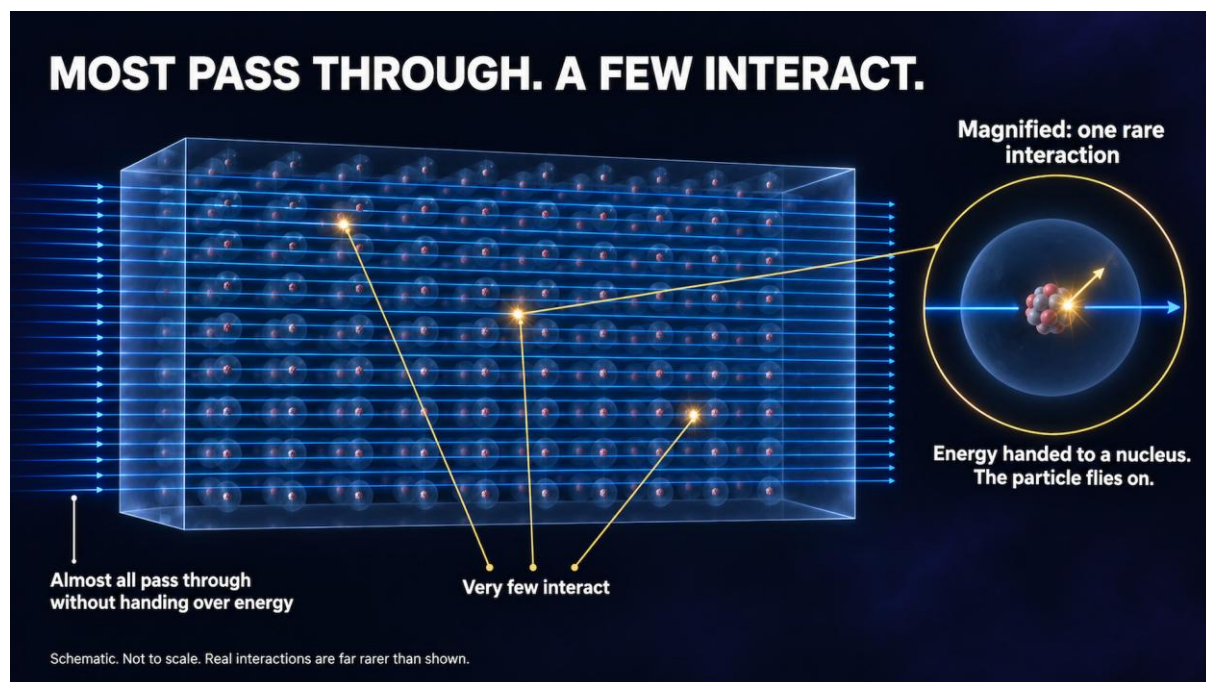
A neutrino carries no electric charge and answers only to the weak force and gravity. The electromagnetic forces that make a wall solid and a cloud opaque barely reach it, and atoms turn out to be mostly open space around very small nuclei. Most of the neutrinos that arrive at the Earth leave it again on the other side.

Most neutrinos pass through matter without handing over any energy. A few interact through the weak force, and in those rare events energy and momentum are transferred.

Everything that follows hangs on that second sentence. A detector lives on the few. So would any device that relied on neutrinos alone, which is one reason ours doesn't. The count of particles arriving and the amount of power available are different quantities. The first tells you how many pass by. The second tells you how much energy is actually handed over, and only that can drive a current.

Nor is the space around us empty. Radiation and particles of many kinds cross it, and us, at every moment, almost all of them unnoticed.

One more distinction keeps the picture honest. The high-energy neutrinos that IceCube studies are a different population from the common low-energy background that streams out of the Sun. They are far rarer, and each one carries far more energy.



Schematic, not to scale. Almost every particle passes through matter untouched. In a very few events, energy is handed over and the particle flies on. Nothing here is caught or stored.

What matters next is how much energy changes hands, and whether it can be used.

Avery: “Catching” is the word that causes the confusion. A neutrino isn’t caught, stored or used up. It passes through, and now and then it hands a small amount of energy to the matter it crosses. Then it carries on.

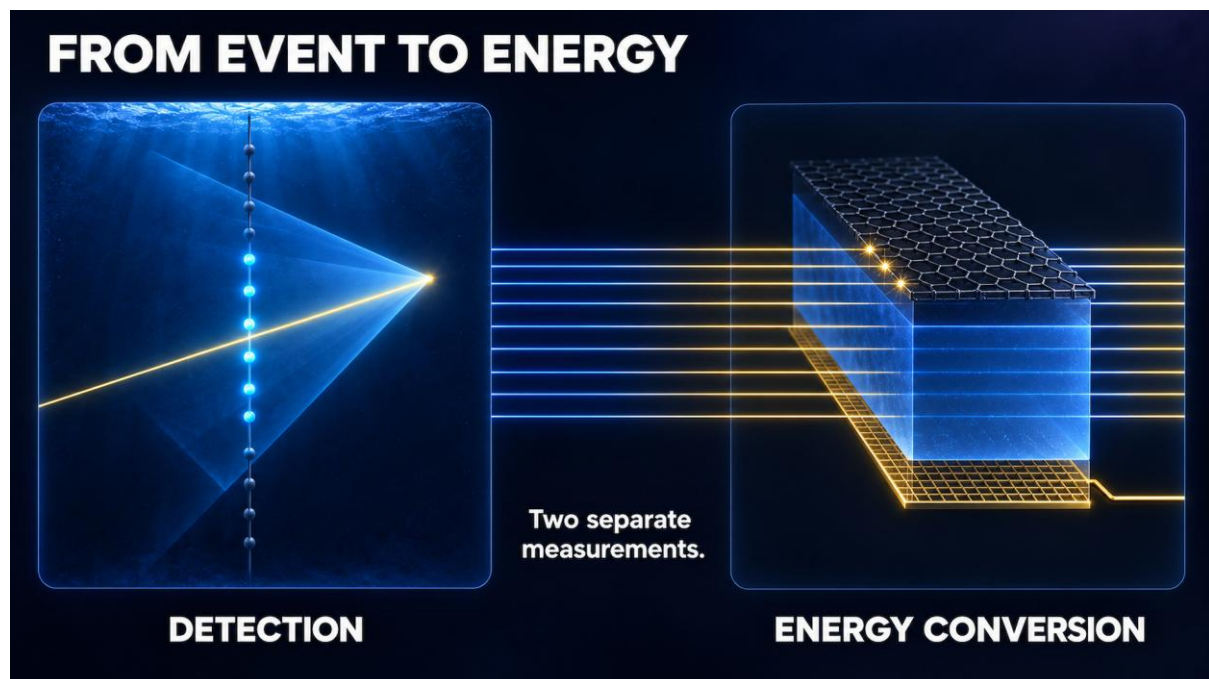
Morgan: For an engineer that settles what a device can be. There’s no trap and no stock of neutrinos to draw on. Whatever a device gets from neutrinos, it gets from those rare handovers while the particle keeps travelling.

Billions of Particles, Very Few Interactions

Both halves of the picture have to be held at once. Roughly 60 billion solar neutrinos cross every square centimetre per second, each carrying a few tenths of a megaelectronvolt. The chance that any one of them interacts while crossing a metre of dense matter is roughly one in ten to one hundred quintillion. Multiply the two and a cubic metre of ordinary matter registers a few solar-neutrino interactions per day.

A thought experiment. Suppose, impossibly, that every solar neutrino crossing the largest face of a Power Cube (about 0.48 m^2) gave up all of its energy. Solar neutrinos carry about 30 watts per square metre in total, so the face would absorb roughly 15 watts. That would warm a 50 kg unit by one to two kelvin per hour if nothing carried the heat away, depending on the materials. A faint heater, not a glow. No real device comes near that ceiling, and the ceiling alone makes the design decision for us: the Power Cube works with five inputs, because neutrinos alone were never going to carry it.

Morgan: I like arithmetic that settles arguments early. This one tells every engineer on the team why the design has five inputs, not one.



Concept illustration. Detection asks whether an event happened. Energy supply asks how much energy is handed over and whether it can leave the material as current. Those are two separate measurements.

Where the Two Cubes Meet

Both cubes start from the same event: a rare interaction between a particle and matter. From there, the questions part ways.

IceCube asks whether the event happened and where it came from. It needs a transparent medium, a grid of light sensors and a way to tell a faint signal from a loud background. The Power Cube asks how much energy changed hands and whether it can leave the material as current. It needs a solid layered structure, charge separation at an interface, a collection layer and electronics that waste little.

A recorded event says an interaction occurred. Power at a socket is settled by evidence of a different kind: each channel measured on its own, a closed energy balance for the whole unit, and reproduction in laboratories that aren't ours. That hand-off, from detection to supply, is the project.

The Neutrino Power Cube and Neutrinovoltaics: Five Inputs, One System

It's a compact unit of about $800 \times 400 \times 600$ millimetres (width, depth, height) and about 50 kilograms, which Neutrino® Energy Group is developing as a source of electrical power. The path from input to consumer has six links: energy input, material response, charge separation, electrical collection, power electronics, consumer. Every link has to work, and every link loses something, so we design every link to lose as little as possible.

Five energy channels feed the first link, and they are treated as one coupled system. Neutrino interactions are the rarest of the five and the one that named the field. Neutrinos can transfer energy and momentum in two ways that physics has pinned down. In neutrino-electron scattering the neutrino knocks an electron out of its path. In coherent elastic scattering it gives a tiny push to a whole atomic nucleus at once, a process Freedman predicted in 1974 and the COHERENT experiment observed in 2017, independently of our work. Cosmic muons and other secondary particles from the upper atmosphere form a second particle channel. They are charged, they ionise the matter they cross, and they interact far more readily than neutrinos do. Electromagnetic radiation, from ambient radio-frequency fields to sunlight, is the most familiar input, and it excites charge carriers in the material directly. Thermal fluctuations are

the constant jitter of matter at ambient temperature. Mechanical vibrations come from buildings, roads and the ground itself.



FIVE INPUTS, ONE SYSTEM

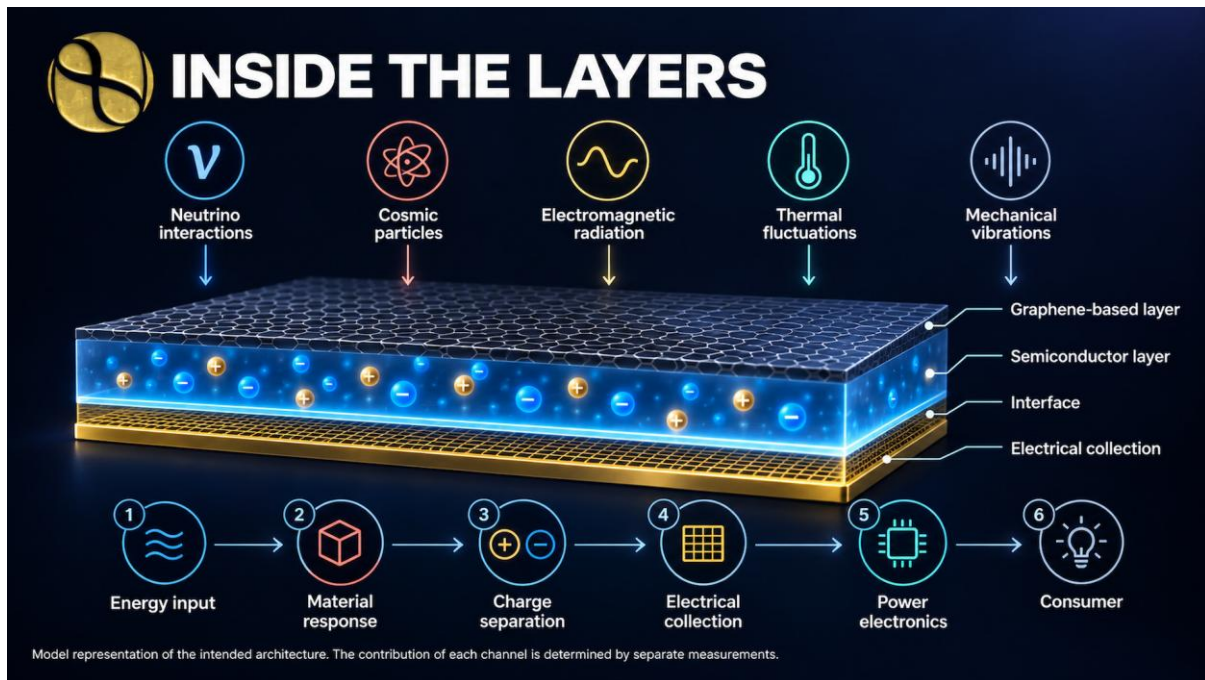
Input	What it is	Established physics	Studied in our structures	Measured contribution
Neutrino interactions	Rare energy transfer in neutrino-electron and coherent neutrino-nucleus scattering	COHERENT, 2017, independent of our work	Yes, as one input among five	Determined by separate measurement
Cosmic muons and other secondary particles	Particles from the upper atmosphere, interacting far more readily than neutrinos	Established particle physics	Yes	Determined by separate measurement
Electromagnetic radiation	Ambient radio-frequency fields to sunlight, exciting charge carriers directly	Established physics	Yes	Determined by separate measurement
Thermal fluctuations	The constant jitter of matter at ambient temperature	Established physics	Yes	Determined by separate measurement
Mechanical vibrations	Buildings, roads, the ground itself	Established physics	Yes	Determined by separate measurement

The five inputs of the Neutrino Power Cube. For each one, three questions stay separate: is the physics established, is it studied in our structures, and what has been measured. The next picture shows how all five act on one layered structure.

Each channel acts on the same layered material in its own way. The material is built from graphene-based heterostructures and semiconductor interfaces. Asymmetric architecture and nonlinear behaviour at the interfaces are meant to give small, fluctuating responses a preferred direction, which is what turns a flicker into a current. A collection layer gathers the charge, and power electronics condition it for a consumer.

The laws of thermodynamics set the boundary, and the design is built to stay inside it. Every joule at the consumer comes from an input that can be named.

The name Neutrino® Energy records where the research began, with neutrino interactions. The approach has since grown into five coupled inputs.



Model representation of the intended architecture. Five inputs act on a layered structure. Charge is separated at an interface, collected, conditioned and delivered. The model behind it fits in one line.

Morgan: This is the part I like as an engineer. There's no single heroic component. Many small conversion elements run in parallel and none is indispensable. Capacity grows by adding more, and the unit is meant to fit existing infrastructure without asking it to change.

Avery: And the five inputs don't add up like five batteries. They act on the same layers at the same time. That's why the model treats them as one coupled system, and why each has to be isolated in turn to see what it contributes.

Why These Materials Excite Us

Graphene is where this stops being a thought experiment. In 2004 Novoselov, Geim and colleagues showed that carbon films a few atoms thick are stable, metallic in character and respond strongly to an electric field, with room-temperature mobilities of about $10,000 \text{ cm}^2/(\text{V}\cdot\text{s})$. Castro Neto and colleagues later mapped why: in graphene the electrons behave like massless Dirac particles. Suspended in vacuum, a graphene sheet pushes electron mobility above $200,000 \text{ cm}^2/(\text{V}\cdot\text{s})$.

Then it got stranger, and better. Near charge neutrality, electrons and holes in graphene form a strongly interacting Dirac fluid, and heat and charge transport stop obeying the textbook Wiedemann-Franz law. In doped graphene, electrons flow like a viscous liquid, with whirlpools near the contacts and a viscosity roughly an order of magnitude above that of honey. A single layer also conducts heat exceptionally well. Electrons in any solid trade energy with lattice vibrations, too, a coupling that first-principles theory now calculates material by material. Charge and heat, each with its own rules, in one atom-thin sheet.

Avery: I could spend a week on the Dirac fluid alone. Electrons that flow like a liquid thicker than honey, in a sheet one atom thick. Nature is not shy about handing engineers odd tools.

Fluctuations are the other half of the story. A micron-sized sheet of freestanding graphene is in constant motion at room temperature. Thibado and colleagues measured that motion through the displacement current it induces, modelled it, and showed how it couples into a circuit with diodes, with experiment and theory in excellent agreement. In 2023 they worked out, in theory, how such a ripple can charge storage capacitors through a circuit of two opposed diodes: detailed balance is temporarily broken, the energy comes from the thermal bath of the diodes, and the first and second laws of thermodynamics hold throughout. The charging happens while the circuit relaxes toward equilibrium, and that approach can be ultraslow. Geometry can do a diode's job as well: asymmetric graphene structures rectify without any junction, and the theory of Brownian motors explains how asymmetry plus a drive away from equilibrium turns unbiased fluctuations into directed transport.

That is the neighbourhood our structures live in: layered graphene and semiconductor, asymmetric by design, working away from equilibrium and collecting what the environment hands over. The effects above are published, peer-reviewed and independent of us. Stacking them into one structure and measuring what comes out is our job.

Holger-Thorsten Schubart and the Master Formula

Behind the approach stands the mathematician Holger-Thorsten Schubart, CEO of Neutrino® Energy Group, whom the Group calls the Architect of the Invisible. In 2024 he formulated the Schubart Master Formula, also published as the Schubart–NEG Master Equation: one expression for how an ambient field, an engineered material and electrical output relate to each other. It describes how continuous ambient interactions can be converted into usable

electrical power within structured matter under non-equilibrium conditions. It stays inside known physics and expands how established principles are applied.

“The physics was never hidden. It was simply never assembled for this purpose.”

Holger-Thorsten Schubart, Mathematician, CEO of Neutrino® Energy Group

THE SCHUBART MASTER FORMULA

$$P(t) = \eta \cdot \int_V \Phi_{\text{eff}}(\mathbf{r}, t) \cdot \sigma_{\text{eff}}(E) dV$$

MEANING OF EACH TERM

$P(t)$	η	$\int_V$	$\Phi_{\text{eff}}(\mathbf{r}, t)$	$\sigma_{\text{eff}}(E)$
Electrical output power	Conversion factor	Volume integral	Effective ambient input	Effective coupling
Time-dependent usable electrical output power, in watts (W)	Resonance, rectification and material design efficiency. Dimensionless, 0 to 1	Sum over the active material volume V	Local strength of the inputs acting on the material at position r and time t	How strongly the material couples to the input at energy E

The Schubart Master Formula in words: electrical output power equals a conversion factor times the effective ambient input times the effective coupling of the material, integrated over the active material volume.

Read it from left to right.

$P(t)$ is the time-dependent usable electrical output power, measured in watts. Energy is the time integral of that power, measured in joules or kilowatt-hours.

η is the conversion factor, a dimensionless number between 0 and 1. It captures resonance, rectification and the efficiency of the material design.

$\Phi_{\text{eff}}(\mathbf{r}, t)$ is the effective ambient input: the local strength of the inputs acting on the material at position $\mathbf{r}$ and time t .

$\sigma_{\text{eff}}(E)$ is the effective coupling of the material to that input at energy E .

The integral runs over the active material volume V .

If the input is the same everywhere in the material, the integral collapses to a product: $P = \eta \cdot \Phi_{\text{eff}} \cdot \sigma_{\text{eff}} \cdot V$. Four levers, then: how well the structure converts, how much arrives, how strongly it couples, and how much active volume you build. Three of them belong to physics and materials. The fourth belongs to manufacturing.

Go deeper: the mathematics, with assumptions and special cases, is on [World of Mathematics](#). The canonical description is on [pt-masterformula.com](#). The physical reading, with the fuller five-factor form, is on [World of Physics](#). And [From Pauli to Schubart](#) tells the story from a worried letter in 1930 to this formula.

Avery: This is my favourite kind of equation: short enough to read in one breath, with a conversion factor, a field, a coupling and a volume. The integrand even factorises, which makes a mathematician very happy.

Morgan: For me the term that matters is V . Capacity grows with active volume, and volume is something you can build. That's how a formula becomes a product line.

What Does “Success” Mean for Each Cube?

IceCube succeeds when it detects rare events cleanly, reconstructs them reliably and shows that they are statistically real. The Power Cube will succeed when a consumer connected to it receives electrical power, stably and repeatedly, over time. The two yardsticks have almost nothing in common, and the table puts them side by side. The criteria on the IceCube side are those of experimental particle physics, and IceCube meets them. The criteria on the Power Cube side are the ones Neutrino® Energy Group has set for it.



WHAT COUNTS AS SUCCESS?

	IceCube	Neutrino Power Cube
Task	Detect particle events and evaluate them scientifically	Provide usable electrical power (development goal)
What is measured	Light signals and their spatial and temporal distribution	Voltage, current, power and energy over time
Result	Information about particles and cosmic sources	Electrical energy at the consumer
Quality criteria	Event detection, reconstruction quality, statistical significance	Net power, stability, reproducibility, lifetime
Core challenge	Distinguishing rare signals from background	Quantifying energy sources and controlling conversion losses

The detection of an interaction and a reliable energy supply require different technical evidence.

IceCube is an independent research collaboration, not part of the Neutrino® Energy Group.

Two cubes, two tasks, two kinds of proof. The next question is how a layered material becomes a device.

The first yardstick answers a question about nature. The second answers a question about engineering, and volts, amperes and time settle it.

Morgan: For us the yardstick sits at the socket, not at the particle.

From Material to Device

A layered structure doing something interesting under a microscope is where the story starts. Three steps lead from there to a device.

The first is the material layer, the heterostructures and interfaces where conversion is meant to happen. The second is the module, in which many small elements are connected so that their outputs add up. That is the distributed idea behind the design: parallel elements, none of them indispensable, with capacity that grows by adding more. The third is the Power Cube, which brings modules, collection and power electronics into one housing. It is the target architecture, and it should fit existing infrastructure without asking it to change.

Morgan: A module is where manufacturing starts to matter. Identical elements, repeatable contacts and a housing that fits existing infrastructure decide whether a laboratory result survives production. I want it to survive production. That's the whole point.

Every step can lose what the one before it gained. Contacts add resistance, no two elements are exactly alike, heat builds up, materials age, and the electronics consume some power themselves. Scaling has its own physics, and we plan for it from the first sketch. Layered materials, modular assembly and power electronics are mature engineering disciplines. The Power Cube is what happens when you combine them on purpose.



Target architecture, product visualisation based on approved reference images. From material layer to module to Power Cube: each step builds on the one before it.

Where We Stand

Neutrino® Energy Group is developing the Neutrino Power Cube, and we say exactly where that work stands. The processes behind it are established physics. What we have to show is the net contribution of each channel and a closed energy balance for the whole unit, and we have a five-step path to get there.

Single structures come first: characterised, measured and understood, with their response to each input on its own. Controlled measurements follow, in which each channel is isolated, shielded or switched so that its contribution is known rather than assumed. Independent laboratories that aren't ours then reproduce the results. The step from sample to module to unit has to keep what the sample showed. And the whole has to run for a long time, months and years rather than hours, because a lifetime figure can only be earned by waiting.

We publish goals and evidence separately. A goal says where we're heading. Evidence says where we are. Our yardstick is measurable power at the consumer.

What We Want to Make Possible

Here is the question we keep asking: what changes when energy stops needing to be planned for?

Picture a clinic at the end of a long road. The diesel truck comes when the weather allows. The vaccines stay cold when it doesn't, because the power is already there, in a box next to the wall. Picture a relief camp that has light and clean water on the first night, not the fifth. Picture a farmhouse kitchen that doesn't care what the grid is doing this evening.

Getting there takes a different architecture. Energy supply has had two familiar shapes: Fuel → Power Plant → Grid → Consumer, and Renewables → Storage → Grid → Consumer. We're working on a third: Ambient Energy → Local Conversion → Consumer. We call the shift between them the Energy Architecture Transition. The grid stays what it's good at, connection, reserve and balancing layer. It just stops being the precondition for every kilowatt-hour.

That is the promise of decentralised supply, and it's concrete. No fuel logistics. No single point of failure, because the unit is built from many parallel elements. Power where the load is, whether the load is a ward, a drone or a boat.

Avery: Look at the formula again. Nothing in it mentions a power line. The field is everywhere, so what you design is the response and the volume.

Morgan: And that's the industrial logic. We're building platforms, not one-off gadgets. The Power Cube is the stationary one. The Life Cube adds climate control and water from air. Pi Car, Pi Fly and Pi Nautic take the same layers into cars, drones and boats, and they share one

core material architecture and one manufacturing base, so every efficiency gain in one lifts the other two. Partners such as C-MET Pune on materials science and SPEL Technologies on energy storage cover the disciplines that turn a platform into a product.

The Road Ahead

The road has four stations, and we can name all of them. It starts with mathematics: a formula that says what to measure. It continues in materials: layered graphene and semiconductor, asymmetric by design, tuned channel by channel. It scales in modules: many small elements, none of them indispensable, capacity that grows by adding more. And it ends in industry: a manufacturing base, partners who know their disciplines, and units that someone can plug a load into.

Each station is a piece of work with a method and a finish line, and we like it that way.

Avery: I'll keep asking why it works.

Morgan: I'll keep asking how many we can build.

It's a road worth following, and we intend to keep it open to anyone who wants to watch.

Science makes the invisible in the ice visible. We are working to make it usable in the circuit.

For over a century, energy has been something we extract. The next era begins when energy becomes something that is simply available.

Geneva, October 2026

Frequently Asked Questions

What is IceCube?

IceCube is an international research collaboration led from the University of Wisconsin-Madison, and the name of its detector at the South Pole. The instrument fills about one cubic kilometre of Antarctic ice with roughly 5,160 light sensors on vertical strings. You'll sometimes see it written as "Ice Cube", but the observatory's own spelling is IceCube. It studies neutrinos, above all high-energy ones that come from outside our solar system.

How are neutrinos detected?

Not directly. A neutrino is invisible and almost always passes straight through. In rare cases it interacts and produces charged particles, and these emit faint blue Cherenkov light as they move through transparent material such as deep ice or water. Light sensors record that light, and researchers reconstruct from its pattern where the particle came from and how much energy it carried.

Are neutrinos captured?

No. Neutrinos aren't caught, stored or used up. A detector registers the products of a rare interaction, and the neutrino itself is inferred from them. In the same way, a rare interaction in a material transfers a small amount of energy and the particle carries on. In neither case is there a trap, and in neither case is there a stock of neutrinos to draw on.

What is the Neutrino Power Cube?

It's a compact unit of about $800 \times 400 \times 600$ millimetres that Neutrino® Energy Group is developing to provide usable electrical power. The approach is multichannel: several energy inputs act on layered materials, and the resulting charge is collected and conditioned for a consumer.

What is neutrinovoltaics?

It's the name Neutrino® Energy Group gives to its multichannel approach: several ambient inputs act on layered graphene-based and semiconductor structures, and the resulting charge is collected for a consumer. Its theoretical frame is the master equation of Holger-Thorsten Schubart.

Which energy channels does neutrinovoltaics use?

Five: neutrino interactions, cosmic muons and other particles, electromagnetic radiation, thermal fluctuations and mechanical vibrations, treated as one coupled system. The table above shows what is established and what is measured.

What is the Schubart Master Formula?

It's the mathematical framework of neutrinovoltaics, formulated in 2024 by Holger-Thorsten Schubart: $P(t) = \eta \cdot \int_V \Phi_{\text{eff}}(r,t) \cdot \sigma_{\text{eff}}(E) dV$. The time-dependent usable electrical output power $P(t)$, in watts, equals a conversion factor η times the effective ambient input Φ_{eff} times the effective coupling σ_{eff} of the material, integrated over the active material volume V . The mathematical view is on [World of Mathematics](#), the canonical description on [pt-masterformula.com](#), the physical reading on [World of Physics](#).

How do neutrino detection and energy generation differ?

Detection asks whether an event happened and is judged by signal quality and statistics. Energy supply asks whether a consumer receives power and is judged by net output, stability, reproducibility and lifetime. A detected interaction proves the first only.

Is the Neutrino® Energy Group part of IceCube?

No. IceCube is an independent international collaboration led from the University of Wisconsin-Madison. The Power Cube is not a further development of its detector.

Who are Avery Laurent and Morgan Elia?

They're AI personalities of the Neutrino Engineering District. They're introduced as such, and they explain the scientific and the engineering side of this article.

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