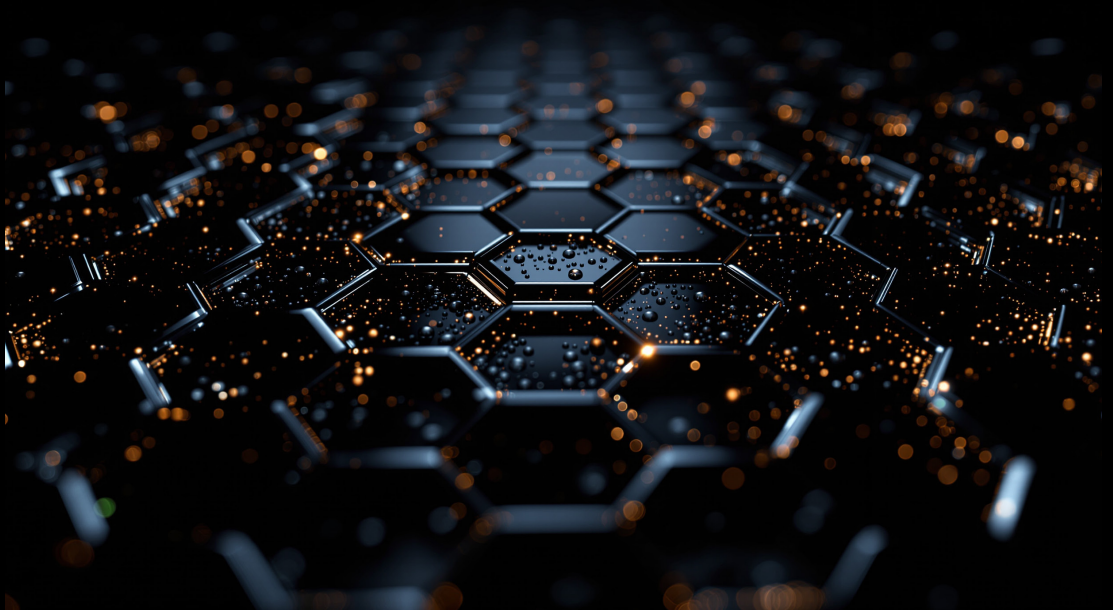
A Brand of
Neutrino Energy

NEUTRINOVOLTAIC®

FUNDAMENTALS & PRACTICE

(LEVEL 8+ MASTER EDITION 2.0)



INTRODUCTION – KNOWLEDGE **LEVEL 8+**

This presentation is part of a multi-level didactic system describing Neutrinovoltaic technology across twelve knowledge levels. Each level is tailored to a specific audience – from interested laypersons to leading scientists.

The Level 8+ document you are holding is specifically addressed to a highly educated audience: academics, engineers, scientists, and decision-makers with advanced technical understanding. It provides a sophisticated, detailed, and logically derived introduction to the functionality, material basis, and mathematical foundation of Neutrinovoltaic technology.

Thus, Level 8+ represents a milestone for expert readers, demonstrating that Neutrinovoltaic technology already rests on a solid scientific foundation and can be understood and discussed at the highest intellectual level.

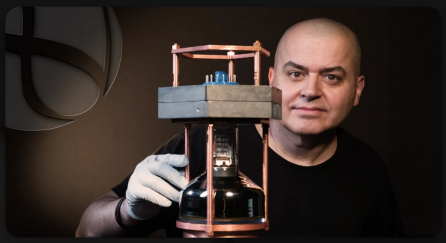
HISTORICAL MILESTONES

1987

Supernova 1987A – detection of neutrinos from a stellar explosion.

2015

Nobel Prize in Physics – detection of neutrino oscillations confirming their mass.

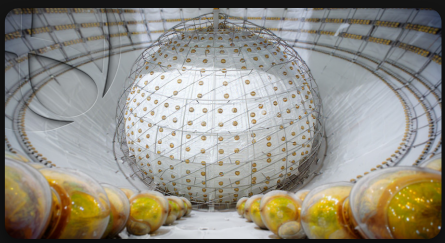


2017

Experimental confirmation of the CEvNS effect

2025

JUNO Observatory provides precise flux data and oscillation measurements.



PHYSICAL FUNDAMENTALS

Neutrinovoltaic technology is based on the principle of energy and momentum transfer from invisible radiation to matter. At its core lies the CEvNS effect (coherent elastic neutrino–nucleus scattering).

Mathematically expressed: $\sigma \propto N^2 \cdot E\nu^2$.

Amplification mechanisms such as Non-Standard Interactions (NSI) and oblique scattering increase overall efficiency.

MATERIAL PROPERTIES

Graphene: Highest charge carrier mobility, direct coupling to phonons, plasmon resonance effects.
Flexural Modes: Graphene membranes oscillate like NEMS resonators; Q-factors up to 10^4.
Doped Silicon: P-N junctions, directed drift currents, resonance amplification.
Multilayer Architecture: 12 layers of graphene–Si yield optimal amplification.
Cosmic Muons: Provide additional energy flux.
Thermal Fluctuations: Act as background noise, enhancing rectification.

THE CONVERSION CHAIN

1. Momentum Transfer:
   - CEvNS generates nuclear recoils in the eV–keV range.
   - Muons deposit energy through ionization.
   - Electromagnetic radiation couples via plasmons.
   - Thermal fluctuations provide baseline energy.

2. Mechanical Response:
   - Graphene vibrates resonantly, amplitude: $\sim Q \cdot F/m\omega^2$.

3. Phonon–Electron Coupling:
   - Deformation shifts Dirac points: $\Delta E\_D \approx D \cdot \nabla \cdot u$.
   - An alternating voltage V_ac(t) is generated.

4. Nonlinear Rectification:
   - Schottky contacts / P-N-Junctions: $I\_DC \approx \frac{1}{4}(d^2I/dV^2) \cdot V\_rms^2$.

5. Layer Summation:
   - Currents add up across multiple layers.

6. DC Stabilization:
   - Power-management ICs smooth the current.

FROM STAGES 1–6

THE MASTER FORMULA OF NEUTRINOVOLTAICS IS DERIVED:

$$I\_NV = \alpha \int \Phi\nu(E) \cdot \sigma\_CEvNS(E) \cdot \Delta p\_\nu\rightarrow N(E)\, dE + \beta \cdot \Phi\mu \cdot \langle \Delta E\mu \rangle + \gamma \cdot \Phi\_EM \cdot \eta\_plasmon + \delta \cdot \Phi\_th \cdot k\_B\, T$$

with:

$\Phi\nu(E)$ – Neutrino-flux density
$\sigma\_CEvNS(E)$ – CEvNS-Cross section
$\Delta p\_\nu\rightarrow N(E)$ – Momentum transfer
$\Phi\mu$ – Muon flux ($\sim 100\ m^{-2}s^{-1}$)
$\langle \Delta E\mu \rangle$ – Average energy deposition of muons
Φ_EM – Electromagnetic environmental radiation
$\eta\_plasmon$ – Coupling efficiency via plasmons
Φ_th – Thermal fluctuations
$k\_B\, T$ – Thermal energy

The mathematical modeling and development of this master formula were carried out under the direction of Holger Thorsten Schubart. Since 2008, he has been primarily responsible, as a mathematician, for the theoretical foundation and conceptual implementation of neutrinovoltaic technology.

PERFORMANCE PARAMETERS & SCALING

Theoretical: 3–5 kW per 1,500 m² of active surface area.
PowerCube: ~5 kW continuous output, independent of time of day and weather.
Temperature management: ±15 % without, ±3–5 % with active regulation.
Applications: PowerCube, Pi-12 Platform, Mobility, Sensor Systems.

OUTLOOK

Neutrinovoltaic technology marks the beginning of a new era in energy generation — decentralized, weather-independent, clean.
A technological leap that dissolves dependencies and enables global cooperation.

LITERATURE & REFERENCES

Kamiokande II & IMB Collaborations (1987). Observation of a neutrino burst from the supernova SN1987A. Phys. Rev. Lett. 58, 1490. DOI: 10.1103/PhysRevLett.58.1490

Kajita, T. & McDonald, A. B. (2015). Nobel Prize in Physics – Discovery of neutrino oscillations.

Akimov, D. et al. (2017). Observation of coherent elastic neutrino-nucleus scattering. Science 357, 1123–1126. DOI: 10.1126/science.aao0990

An, F. et al. (JUNO Collaboration) (2016). Neutrino Physics with JUNO. J. Phys. G 43, 030401. DOI: 10.1088/0954-3899/43/3/030401

Neto, A. H. C., Guinea, F., Peres, N. M. R. (2009). The electronic properties of graphene. Rev. Mod. Phys. 81, 109. DOI: 10.1103/RevModPhys.81.109

Novoselov, K. et al. (2016). 2D materials and van der Waals heterostructures. Science 353. DOI: 10.1126/science.aac9439

Patent WO2016142056A1 (2016). Method for energy generation from radiation using graphene-silicon multilayers.

Grigorenko, A. N., Polini, M., Novoselov, K. S. (2012). Graphene plasmonics. Nature Photonics 6, 749–758. DOI: 10.1038/nphoton.2012.262

Chipman, E., Diesing, R., Reno, M., Sarcevic, I. (2022). Anomalous ANITA air shower events and tau decays. Phys. Rev. D. DOI: 10.1103/PhysRevD.105.083018

Abbasi, R. et al. (IceCube Collaboration) (2025). Realtime reconstruction of high-energy neutrinos for multimessenger astronomy. Astrophys. J.

arXiv:2509.02652 (2025). Neutrino masses from an alternative approach to the seesaw mechanism.