

NEUTRINO BATH

a space opera in one act



Concept, direction, scenography, light:
Evelina Domnitch, Dmitry Gelfand

Libretto: **Christian Bök**

Music:

Richard Barrett

Alberto Novello

Stephanie Pan

Pinkcourtesyphone

Jasna Veličković

Milana Zarić

Laser-projected mises-en-scène:

Alberto Novello

Scientific advisor: **Kelly Weerman**,
Nikhef (National Institute for Subatomic
Physics, University of Amsterdam),
KamLAND Neutrino Observatory (Hida,
Japan)

Dramatis personae:

Stephanie Pan: physicist, polymath

Jasna Veličković: physicist, inventor

Kelly Weerman: physicist, PhD candidate

Vera Rubin (1928-2016): astrophysicist,
played by Milana Zarić

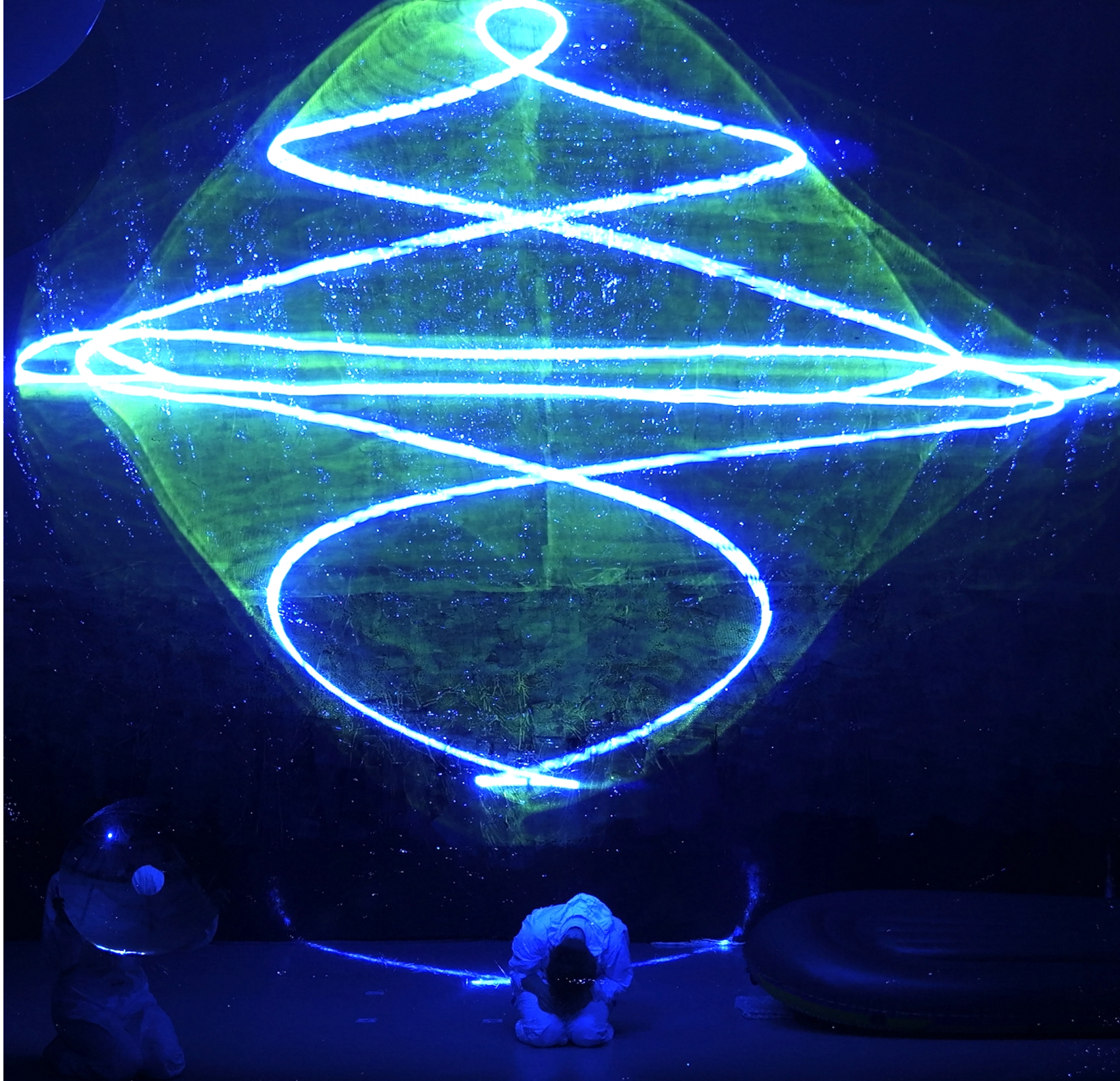
Duration: 60 minutes





Three women physicists float on the surface of a lake buried a kilometre underground — the site of a cavernous neutrino detector. While repairing one of the sensors, their boat flips over, hurling the heroines into the water aglow with neutrino-induced radiation.

Arriving from a supernova 4 billion light years away, the neutrinos penetrate the lake and start blazing faster than the speed of light. This creates shimmering cones of Cherenkov radiation (the optical equivalent of a sonic boom) enveloping the submerged researchers. Descending together to the bottom of the lake in a state of telepathic euphoria, they discover why the universe is not symmetrical.









A nascent form of art-science theatre, *Neutrino Bath* combines exotic physical phenomena with algorithmic poetry, laser-projected sets, choreography and electroacoustics.

While exploring the final frontiers of performance art, cosmology and particle physics, the opera also raises audiences' awareness of the Matilde effect — the tendency to erase women from scientific history.

In the closing scene (pictured above and on the title page), astrophysicist Vera Rubin discovers that 85% of the universe is comprised of an invisible substance: dark matter. Despite her paradigm-shifting discovery, Rubin never received a Nobel Prize for her tremendous contribution to science.





Words of praise for Neutrino Bath:

“In its own way, Neutrino Bath extends Paul Klee’s fascinating formula ‘Art does not reproduce the visible, it makes visible’. This synesthetic opera aims to make phantom particles perceptible and tangible, in an elementary dance combining body, text, sound and light.”

– **Olivier Schefer**, writer and philosopher (author of *Poésie de l’infini* and *Sur Robert Smithson*)

“A visual and musical Gesamtkunstwerk about a supernova, parity violation, oscillation, excitation, antineutrinos, and galaxies. With light and sound in the leading role to make these ghost particles visible and audible.”

– **Hannie van den Bergh**, creator of the feature-length documentary *Neutrino – de dichter onder de elementaire deeltjes*

“Unexpected, unique, usually unseen and unheard physical phenomena actually appear – these all-analogue experiments expand and engulf one’s eyes and ears. Normally undetectable neutrinos manifest magnetic metaphors of laser light luminescence. The libretto’s language virtuosically visualises vibrations in the sublime substance of symmetries. Non-digital, non-objectifying avant-garde in the most radical sense — beyond a classical opus magnum: an opus quantum!”

– **Tommaso Calarco**, theoretical physicist, Director, Institute of Quantum Information (Forschungszentrum Jülich)

