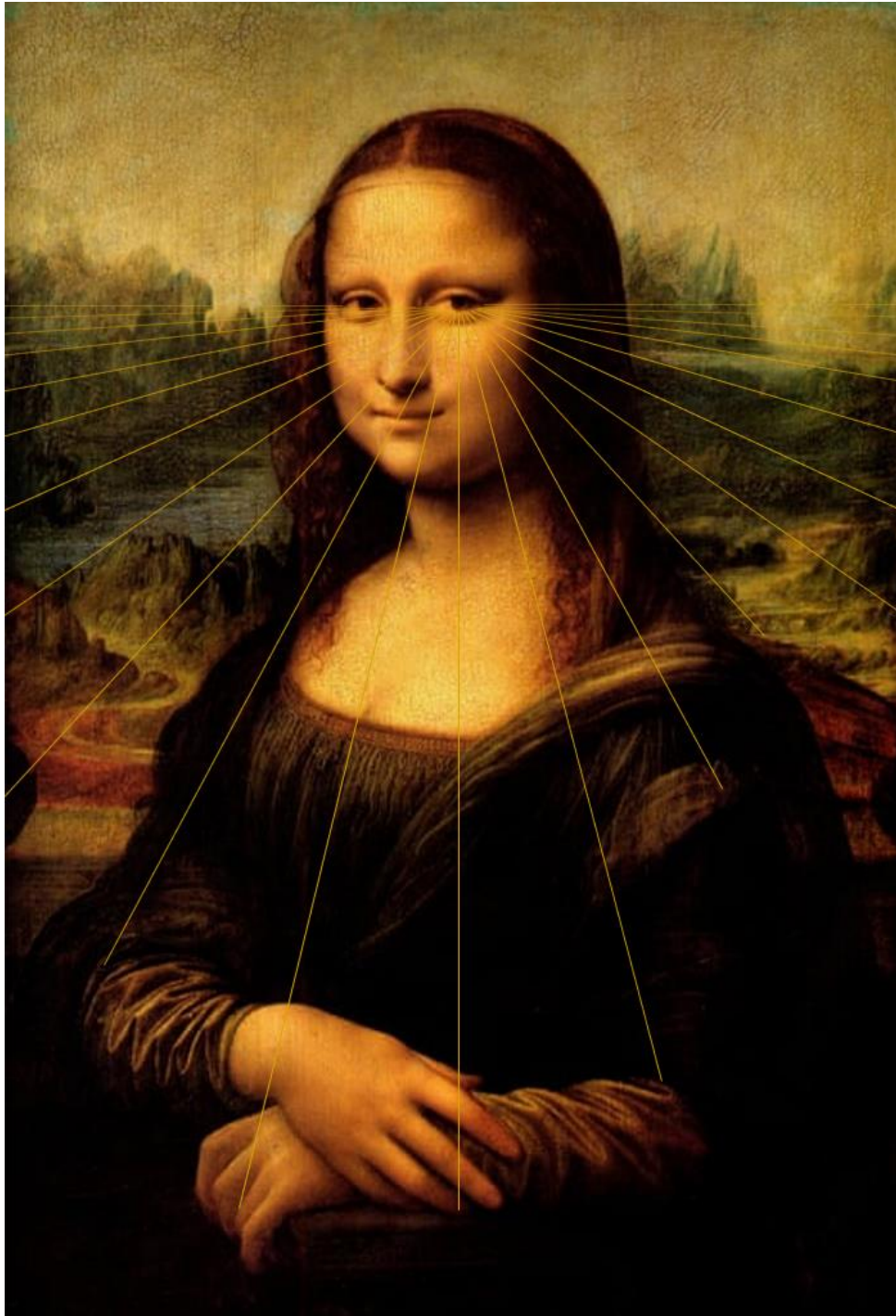


The Vanishing Skylines of Quantum Cosmology

A Holographic Astronomy of the Atom, the Multiverse, and the Mind

M Gaelen Evans



Your Horizon is Here ... and also Here ...

We live in a universe of beauty and terror. The endless detail and colour of every place and moment, our entire existence, are reflected in a distant physical illusion, a holographic image of local life in natural perspective on the cosmological horizon.

Yet this too-incredible reality seems to be tearing itself apart, everywhere diminishing ultimately to nothing – no meaning or resolution, just a relative end of time hidden by dark energy and negative gravitation at a crumbling edge.

Or worse yet, as the incomplete science may still tell us.

How can we understand this? To visualise these dangerous concepts from first principles, we can ‘see’ almost everything from the subatomic to the cosmic via the strange and beautiful imagery of quantum gravity, an emerging field that builds a wave-particle explanation for the cosmos partly by erasing space and time. In the resulting probability of vacuum, the energies are enormous and destructive.

This must be the profile of a fragile, unstable world. Its true genius is the hologram, which replaces spacetime with constructive wave effects that simulate the entire scenery on an imaginary plane. Viewpoints onto the horizon loosely project every possible action in time, distance and direction: sound and light, covariant gravity, entangled fields, as much as the relative depth impressions inside our heads.

That’s not just metaphor, it’s a realistic picture of an uncertain universe at the correct scale in a personal edge of your future, and a primer by illustration of this advanced theory. The cosmos emerges in outline as a relatably fallible mirage fragmented in a prism, the laws of physics in descent from a family of broken anti-symmetries, and the incomplete world falling to a horizon that can be accurately imagined by the harmonic illusions of perspective.

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The Vanishing Skylines of Quantum Cosmology
- a visualisation from many viewpoints

It's a surprising fact that you can see and hear the laws of physics by their effects on visual perspective and harmony – recognisable since the Renaissance as the real optical and aural illusions of depth. Without over-thinking it, these sensory impressions of geometry are almost all you need to visualise the frontier high point of modern science with one of its earliest ideas: the modern *Holographic Principle* and the ancient *Continuity Principle*, which tend to bridge the present to a future event horizon and to an idea of the human mind entangled in the spatial illusions of a hologram. Here the most cosmic experiences are also the most familiar.

How, and why? Atoms and planets obey nearly identical rules of presence and absence, fading with distance and orientation along the converging lines of perspective. Gravity falls away on the same diminishing curvature as light, sound, area or folds of scenery that bend into view like a cameo of warped space. Likewise the fuzziness of an atom is a visual system of subtle depths that project in dynamic arrows from a clock's face. 'Reality' at all scales can be re-imagined as a multi-dimensional cityscape of effects, with light and colour, direction and size as per normal sight and sound, mixed with the experiences of movement and self-weight. This natural picture fills in the future event horizon's strangest feature, the corresponding hologram, a bizarre idea carrying a particle theory of gravity by projecting the local spacetime onto infinity.

Physical perspective geometry is an old yet not quite forgotten idea. It's a beautiful paradigm, one that chimes with all the other beautiful objects of art and science, and a powerful learning tool that places the reader at the centre of their own senses. What's new here, with newly observable consequences, is a sharp and holistic science which tends to take very seriously the profound perceptions that can be found along the open bounds of a horizon, in particular the oddly flat skylines of our universe. At those dark edges, unveiled as you reconsider the sky, you may not be surprised to see yourself and your world distorted at the limits of the observable.

Front Cover: Leonardo da Vinci's La Gioconda with one element of a hologram in the distance. Every point in the immediate scenery lies on one of many parallel lines in the direction of any point on the horizon. Every distant point then refers to every local point by its direction; a type of natural hologram.

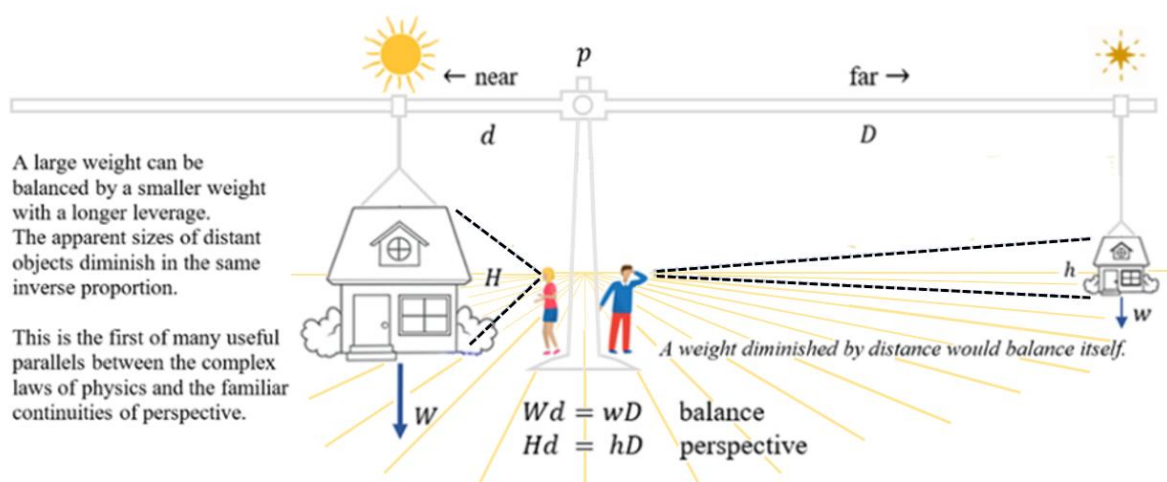
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The End is Near ... and yet Far ...

To visualise this we don't need to see it. Horizons of all kinds share the properties of an edge that diminishes to zero, a step beyond microscopic or subatomic. Equally it is all here, as light is received from stars at distances that stretch out to a limit. Regardless of distance, the sense of it is immediate, rays of starlight being the optima of an action that is everywhere here and now. We can 'look' at it from real and imaginary viewpoints, and overlap many unique layers.

That's not just rhetoric, it's an outline of the as-yet unresolved theoretical technique, in simple terms. This is *quantum gravity*, literally a complex map of vanishing spacetime, and the most blue-sky, cutting edge of all the sciences in question. To build a concept here entails an open account of almost everything, or nothing less than a tale that begins – and ends – everywhere.

This book visualises the limits of scientific knowledge via the Holographic Principle, a union of cosmology, particle physics and neuroscience, with direct connections to the harmonic laws of perspective, meaning geometry from any viewpoint onto distance and area. We walk this bridge between personal experience and physical science every day, over a profound yet formally consistent chasm: that the cosmological acceleration and its pro-inflationary event horizon, the *Big Rip* that may someday await us, are eclipsing effects of distance and orientation, like long shadows stretched out on vast expanses.

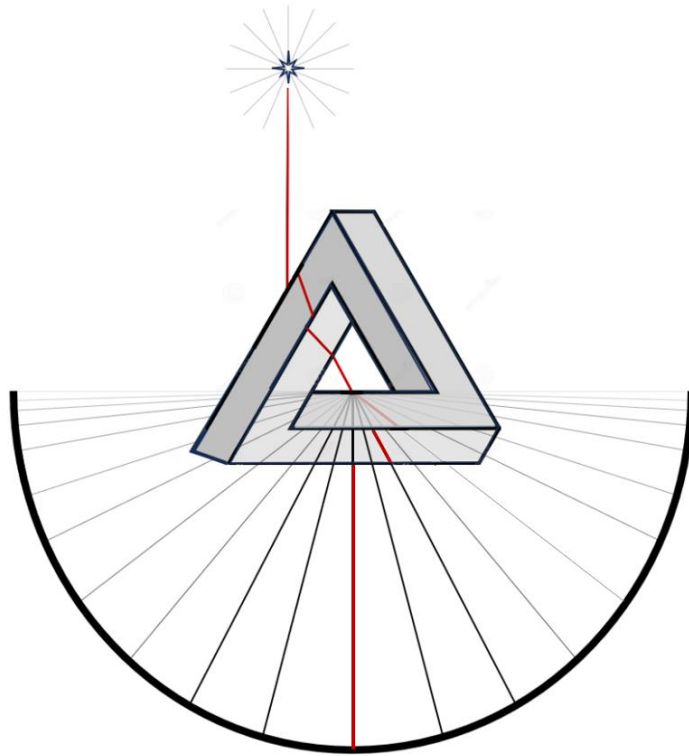


Author Background:

<https://michaelgifans.com/science/the-vanishing-skylines-of-quantum-cosmology/>

The Vanishing Skylines of Quantum Cosmology

or: A Universe Half-Full



For Ronan,
who keeps asking the big ones

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Preface

We could hope, in a world full of life and movement, enriched with music and art, science and poetry, that a promising real future would come more naturally to the human imagination. The view into our world is incredible, an inspiring paradox of illusions that can be imagined in any open window, tangled up in the trees and sky. Yet we exist behind an eclipse, captive to powers that could obliterate everything.

Physics, the study of matter/energy in action and the only science to necessarily question the word 'real', is lost in a crisis that partly explains the calamity threatening to engulf this world. Since the stone age or earlier, the ideas of physics have guided the search for technology and insights into natural law, the language of the actual trees and stones as much as the sky. So it is perilously wrong that this ancient ideal is now answerable, not just for the Earth's own doomsday clock, but also for a darkness in the future of any planet.

This is the science that built the fossil fuel engines of the industrial revolution, the same science embedded in all forms of weapons research. It's the ultimate triple-blinded juggernaut, grinding towards the quantum re-boot of artificial intelligence in an existential risk to work and creativity, twin cores of human identity. Beyond all known vacuum the galaxies accelerate outwards, killing hope for a future while the foundations remain mired in contradiction. As it stands, the universe conceived in physics may leave future generations blind, or cut off from their children in a cataclysm that will reach deep into our local neighbourhoods.

Which is not to attack or deny the science, but to try to experience it, with a compatible re-working of hope.

This book draws a line from the hard geometric ideas of physics to the related physical sensations of sight, sound and depth, which we recognise also through the feelings of weight and movement. Not to say that anything in physics is real, it remains true that we experience the laws of physics directly, even if we don't and genuinely can't understand them. Subatomic, local, stellar, intergalactic and cosmological scales are accessible to your visual imagination by their common holographic geometry, following the same laws of continuity as perspective, balance and the amplifiers of force. The cosmic horizon is as apparent to you as the sky, and its geometry looks very much like the Renaissance rules of landscape.

The illusion of reality emerging across these levels is so strange, and so relevant to the physical and perceptual makeup of human observers, that a cautious reader will need to balance curiosity and visual thinking with profound scepticism, avoiding definite mental images at all costs. This can seem impossible. Science does not operate to artistic standards of truth or possibility, but of evidence, and physics is the most stringent science, often allowing no more than a one in a billion chance that these frankly unbelievable observational facts could be wrong. A holographic to be or not to be time horizon, the end of the world and its surviving contradiction, are visual ideas that can co-exist in one field of view.

To anyone brave enough to want to understand this, the reassuring and somewhat surprising news is that physics lends itself to essentially all of the different sensory and hands-on learning styles of ordinary people. Visual, auditory, text and kinaesthetic (doing) experiences convey the subject by stages to any interested reader, and there is a well-understood physical principle that explains why: the laws of physics correspond exactly to physical experiences, in particular visual experiences, which hide a deep mathematical precision in childhood games and sports, or the rigour of work and creativity, with our often very acute sensory skills.

The first part of this concept is almost obvious, if hard to get until you do get it: Perspective, as in artwork or holography, is essential to the human idea of an open 'real' world out there; as much indeed as geometry is essential to theoretical physics. Our senses (here) perceive events or objects 'over there' to be diminished and softened by the effect of distance, and also foreshortened by orientation as they face directly or obliquely to the view. Gravity, starlight, electromagnetic field, even quantum probabilities fall off into distance in exactly the same way, in inverse proportion to the view-field area at any scale. Interactions and effects, including their amplitude and probability density, are deflected and dilated just as profiles are foreshortened and shadows are lengthened when we observe or measure events at wide or shallow angles.

The flight of a ball or javelin has a visceral rightness that athletes recognise immediately. The inverse square law and sine projection are visible in any art or architecture that seeks a true representation of space and proportion, which are in no way superior to the abstract arts that most resemble particle physics. In the same spaces the wavelike impacts and dazzling energies of anything from atoms to black holes correspond to musical harmonies, with the powerful result that any wavelike signal can be represented as sound; for

example the collision of two enormous beasts of gravity producing a rising crisis of spacetime that chirps like a bird or a whale depending on where you pitch it. All this is to exact geometric and harmonic laws, mathematics that sidestep possibility with evidence to find a universal science in individual viewpoints.

Why should the natural world behave in this brilliantly outlined humane and sensory way? We have to realise that space, time and stuff like ourselves are more akin to ideas or illusions than the ‘real’ dimensional distances, intervals and bodies that we normally imagine. Experiences and the mental structures we build from them are central to this once-removed better concept of reality. We acquire a pretty good grasp of the machinery of physics by participating in it, with a stake of fun or profit in the outcome. The aim of this book is to re-imagine it in visual and auditory concepts, and so make an attempt to *see* and *hear* it.

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Thank you for taking a moment with *The Vanishing Skylines of Quantum Cosmology*. I hope you’re as intrigued as I am. Contact me at michaelgifans@gmail.com if you would like to know more.

The book will be available in bookshops for Mawlid-Samhain-Diwali-Hanukkah-Christmas 2026.

Other than direct quotes referenced in the “Turing test” interview with ChatGPT in chapter 3, no AI tools or generated text were used in the writing of this book.

A ‘Toy Universe’ of Chapter 5 is available for preview in Desmos: <https://www.desmos.com/calculator/mqvxpImadv>