



Acoustic Cosmology

A topological exploration of
music and connectedness



Music of the spheres

a music thought of
not as an audible sound,
but as a mathematical transform



Music of the
n-dimensional hypercube

the utterance
of a cosmological model?

Acousmatic:
sound one hears without seeing
its originating cause
(Pythagorean disciples listened to his lectures
from behind a curtain, unable to see him)

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“... the art
of mental representations
triggered by sound”
Homont [1996]

Acousmatic:

sound one hears without seeing
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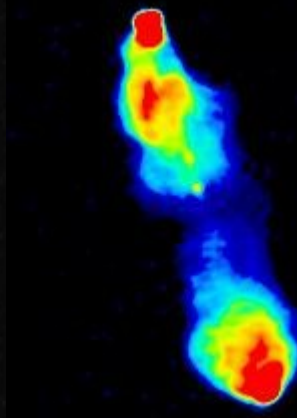
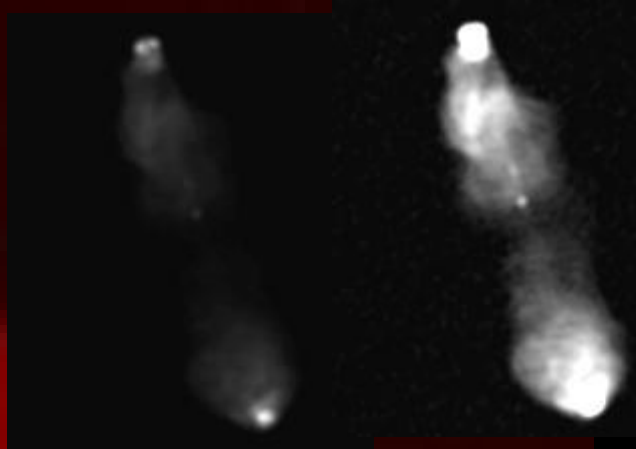
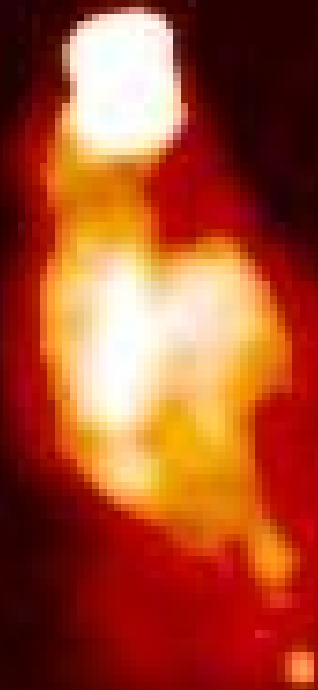
(Pythagorean disciples listened to his lectures
from behind a curtain, unable to see him)

“... the art
of mental representations
triggered by sound”
Homont [1996]

“the sound world is not a space
into which we can enter;
it is a world we treat at a distance”
Goehr [1999]



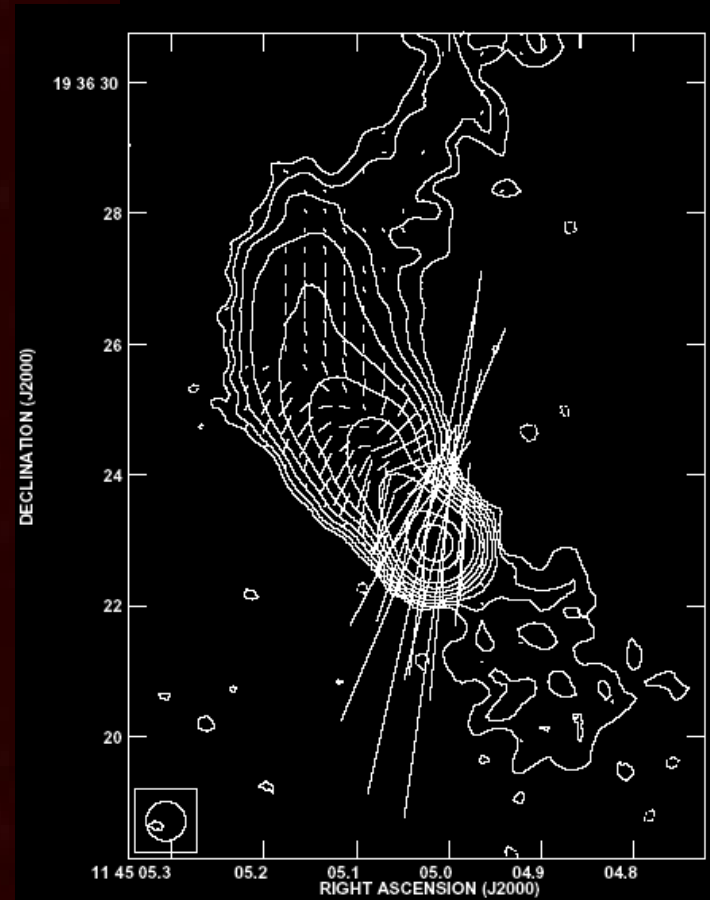
Jodrell Bank, UK

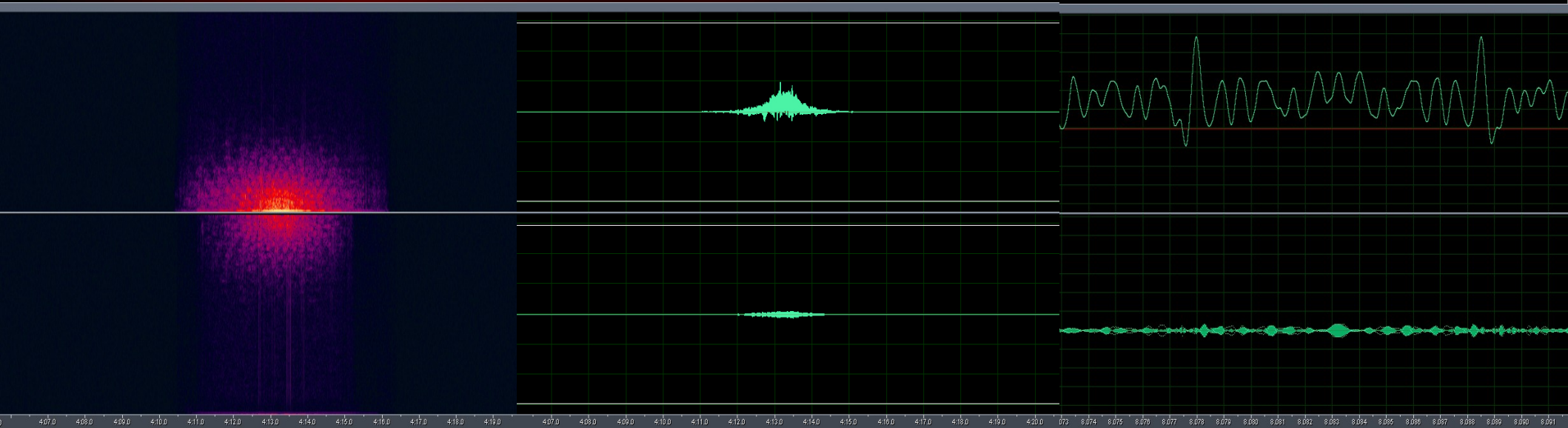


exploring extremes

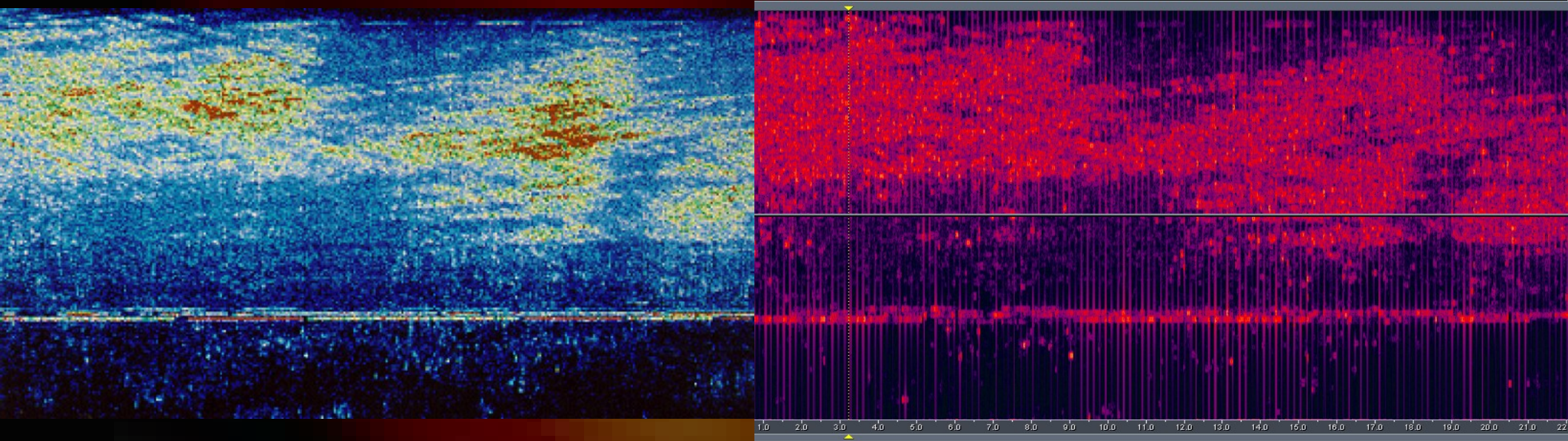
10^{-43} ... 10^9

"can nature truly be this absurd?"
heisenberg

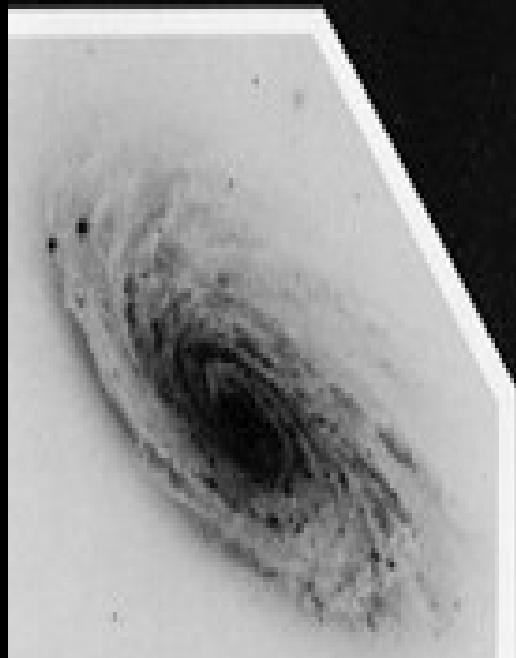




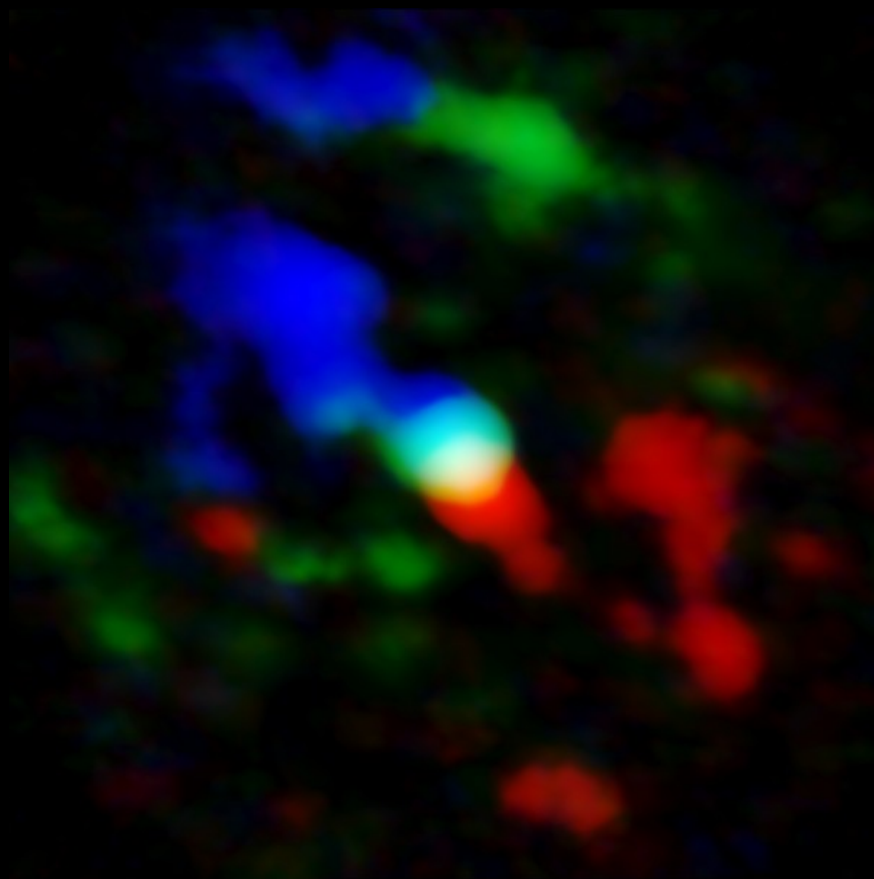
data sonification is acousmatic



ngc4501

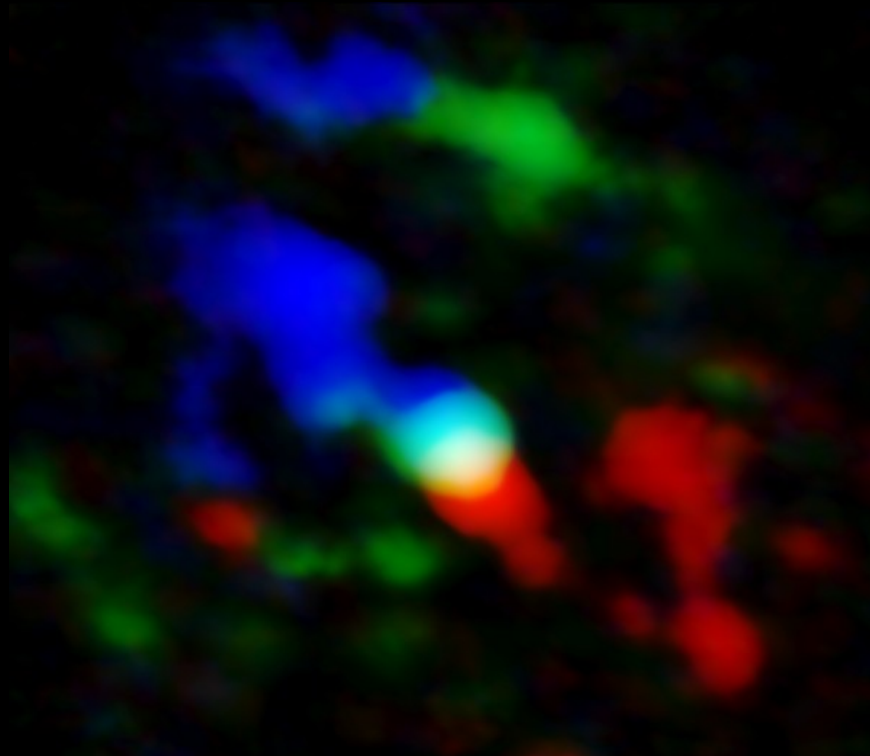


ngc4501



ngc4501

Take a Radio Spectral Cube
and turn it into sound



The cube is like an image, but instead of each pixel being a single "colour" it is actually an RF spectrum. Selecting a pixel with the mouse takes that spectrum and transforms the radio frequencies into an audible range, it then creates a sound with that spectrum.

Similarly, the data has been transformed into visible colours so you can see them based on redshift or blueshift.

You can see and hear the structure of the spiral arms, even the discord in the middle where both are super-imposed.

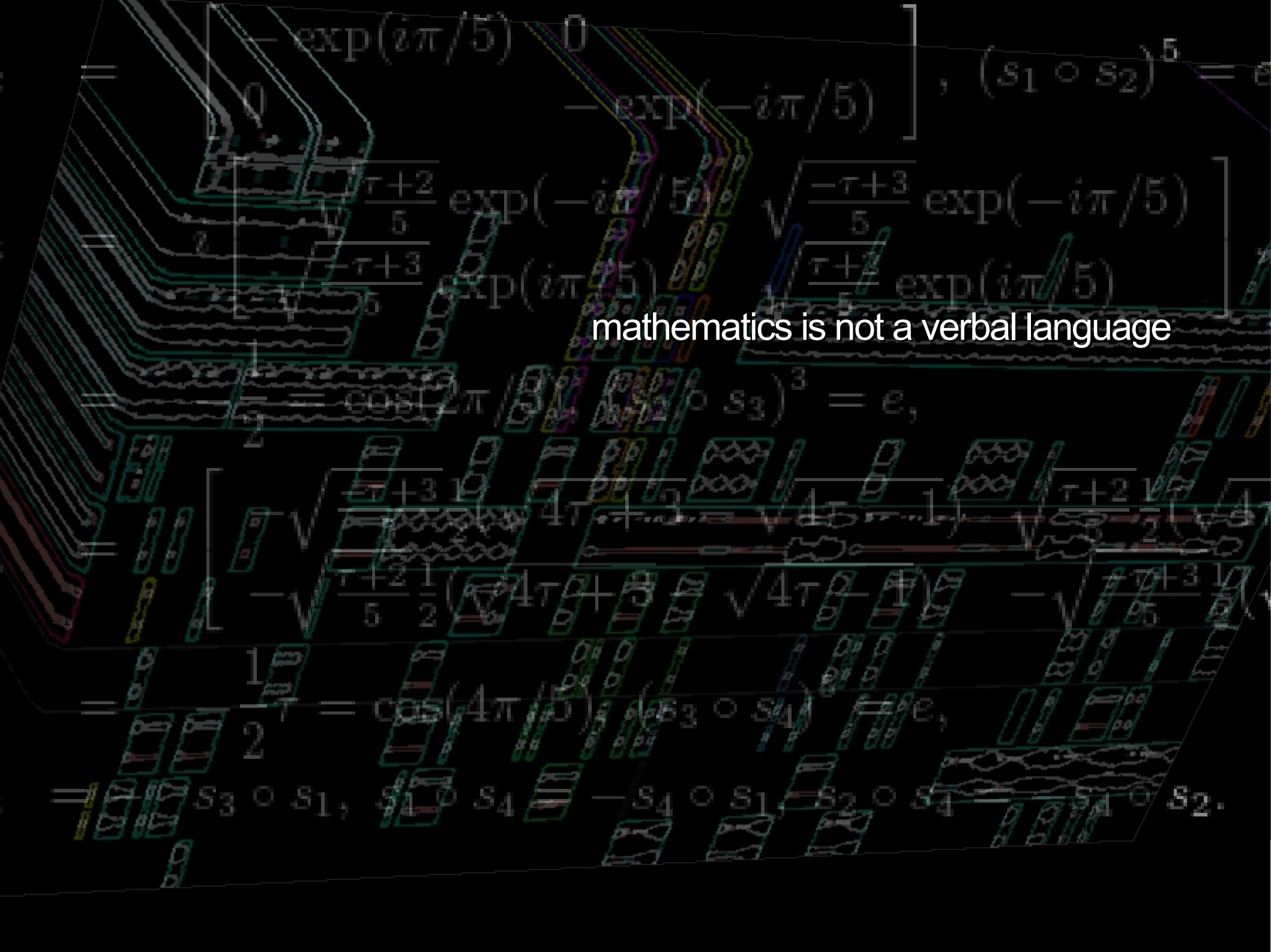
Astrophysicists try to
describe the Universe

seen and the unseen
real and hypothetical

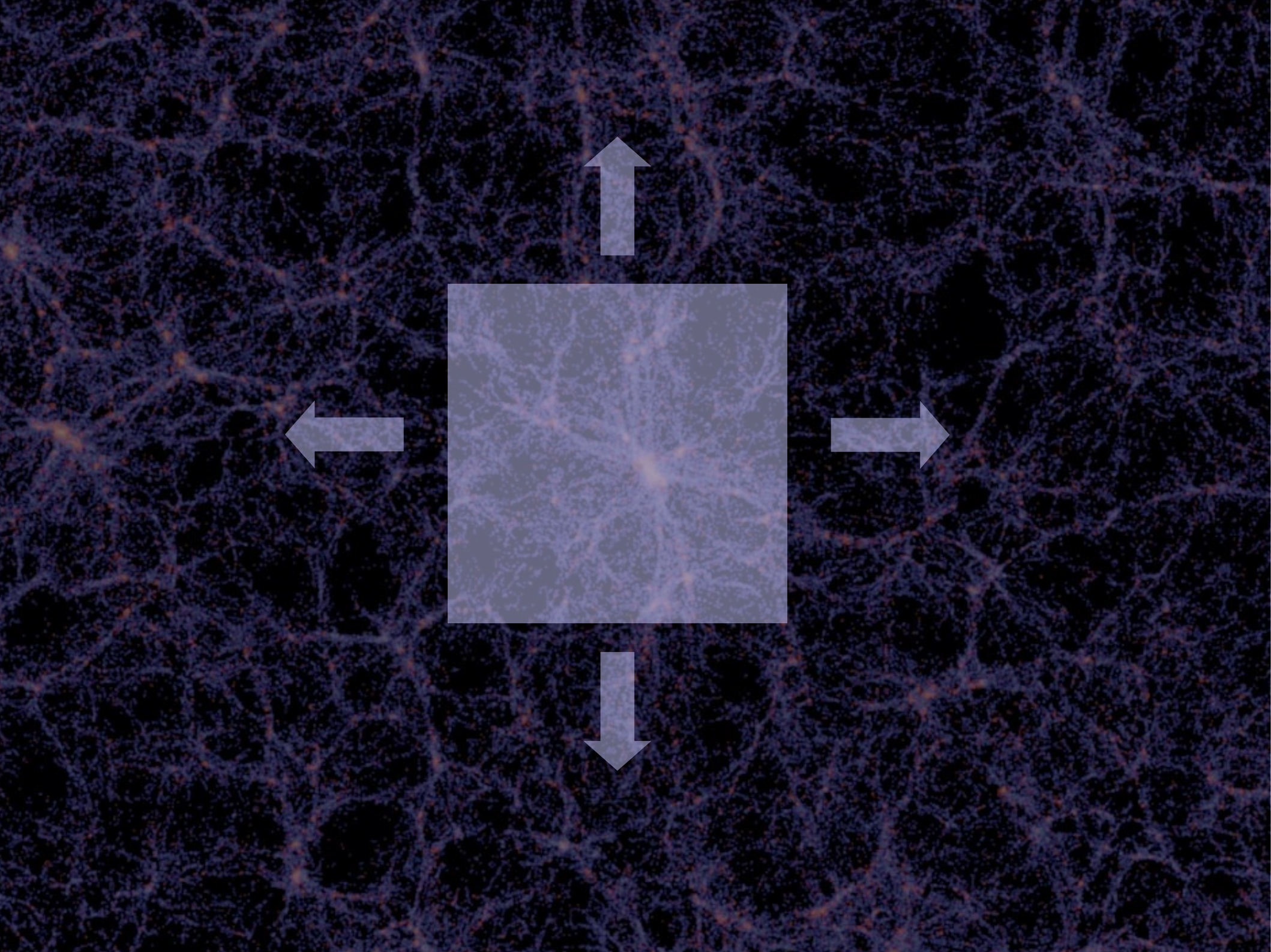
using the language of mathematics

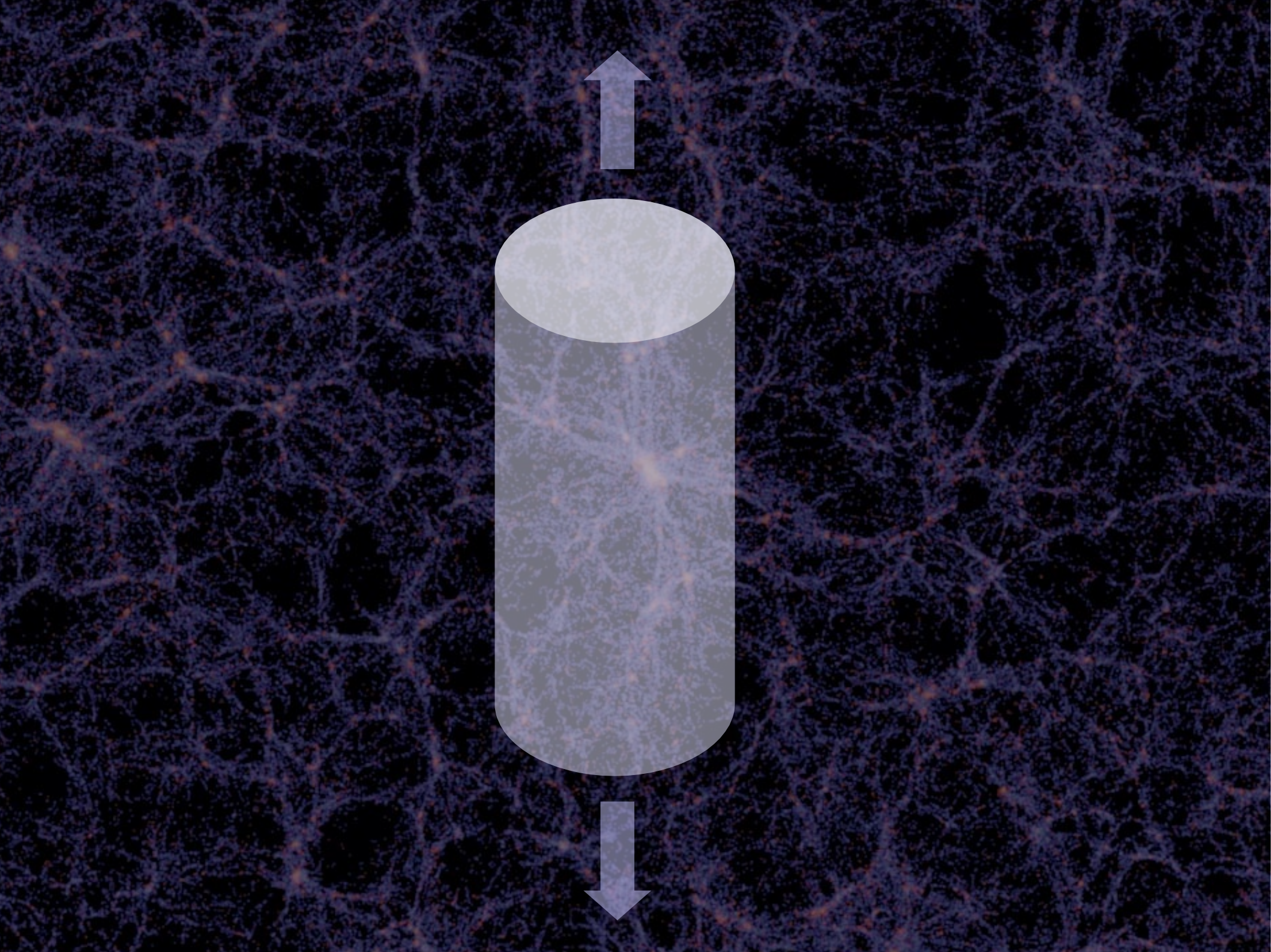
transforming noise into data
and data into knowledge

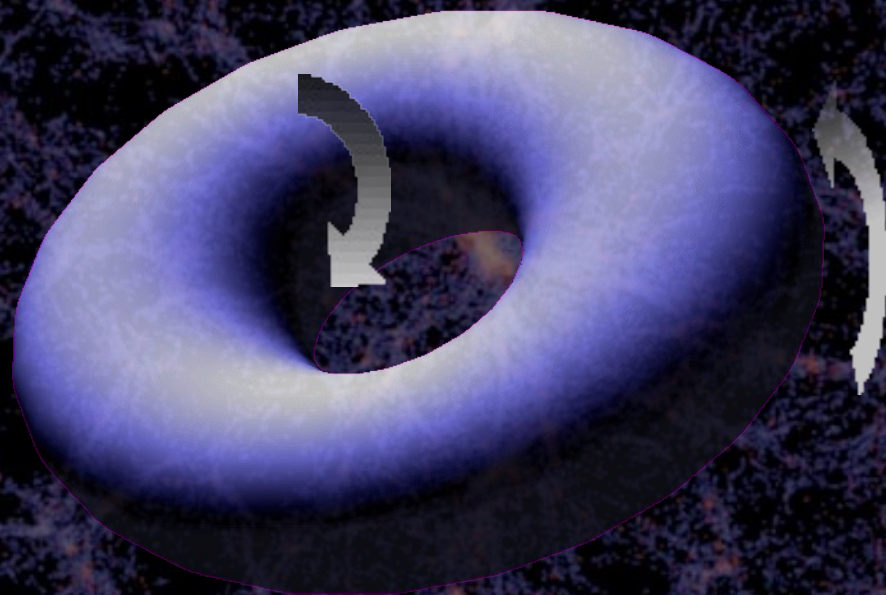
$$ds^2 = (cdt)^2 - R^2(t) \left[d\chi^2 + S_k^2(\chi)(d\theta^2 + \sin^2 \theta d\phi^2) \right]$$

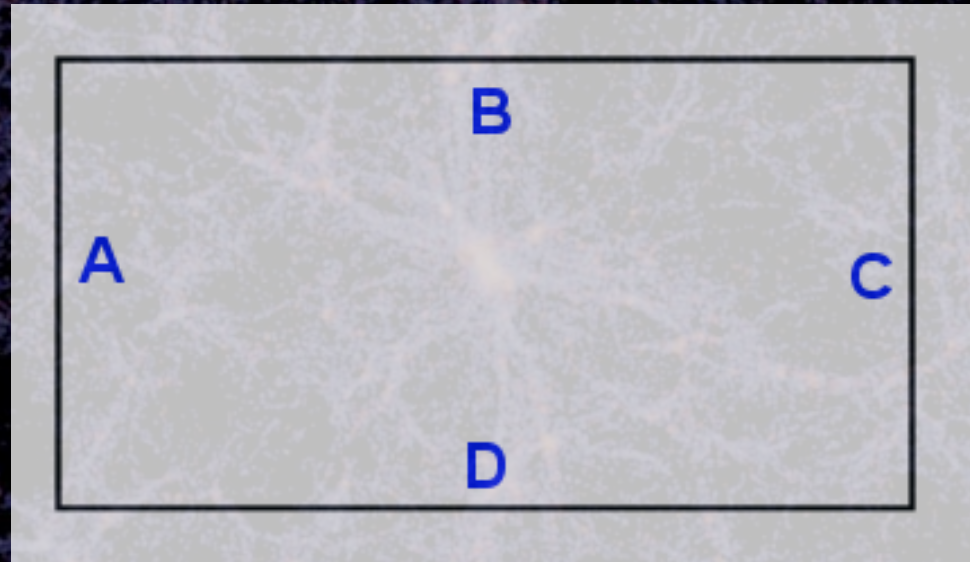


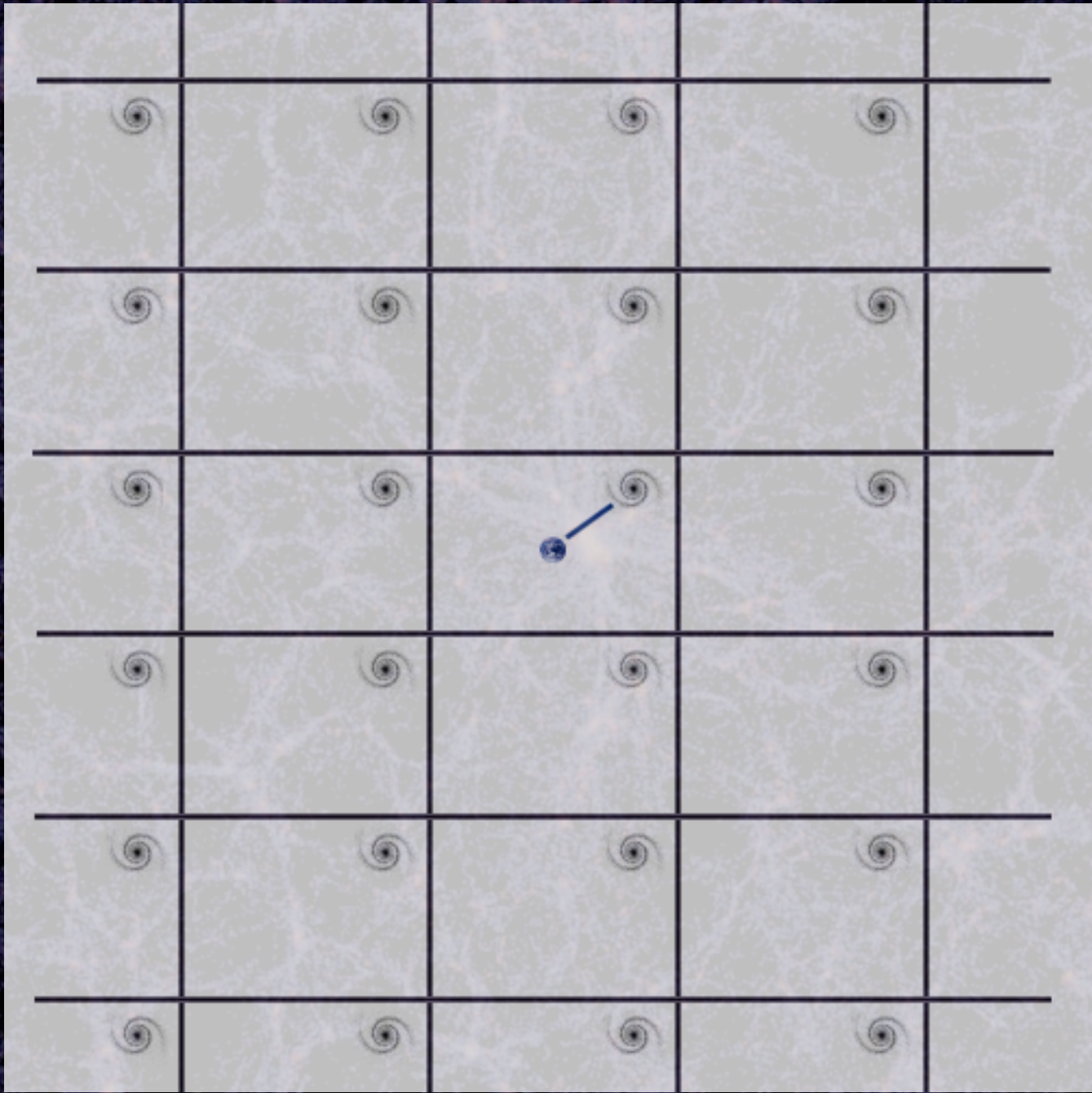
mathematics is not a verbal language

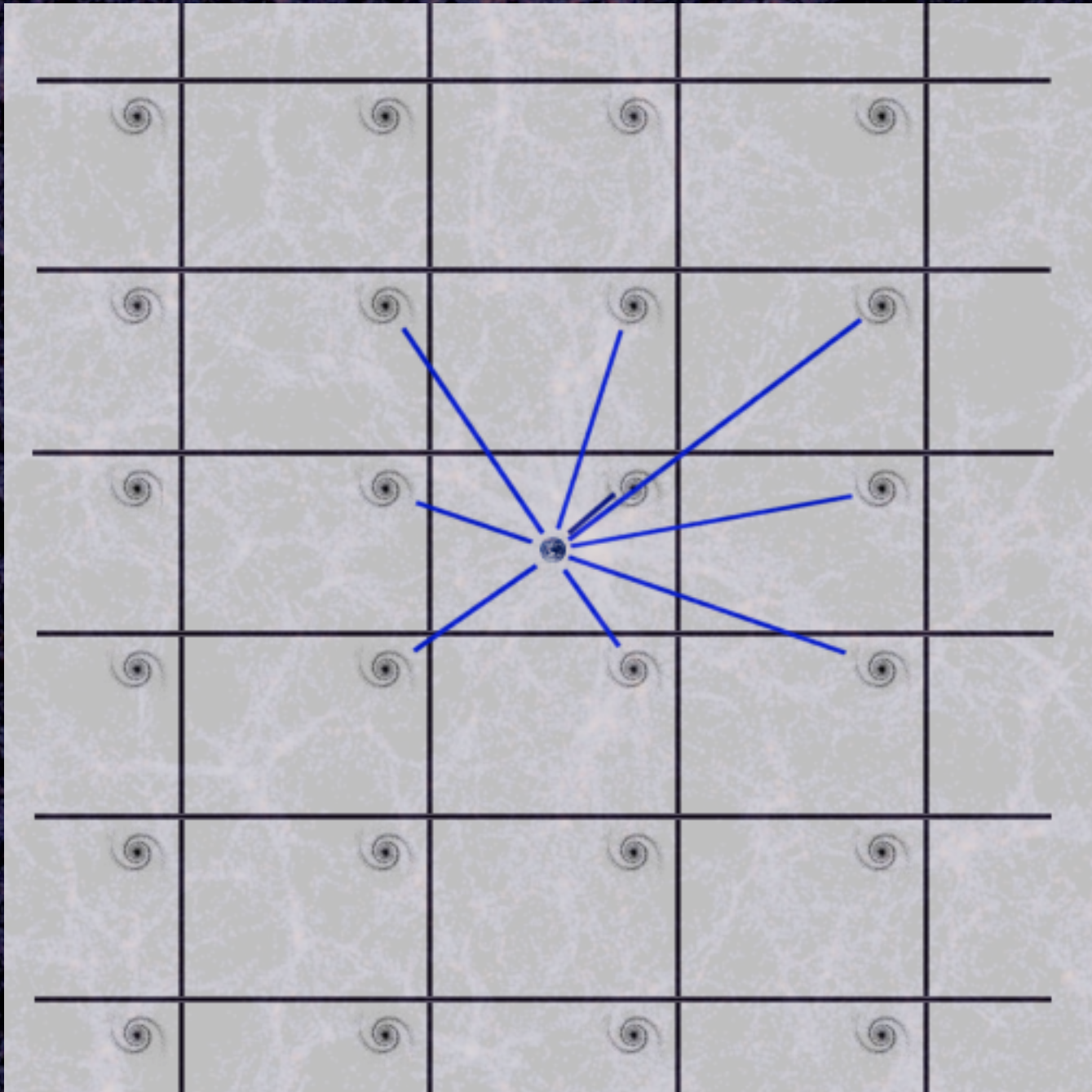


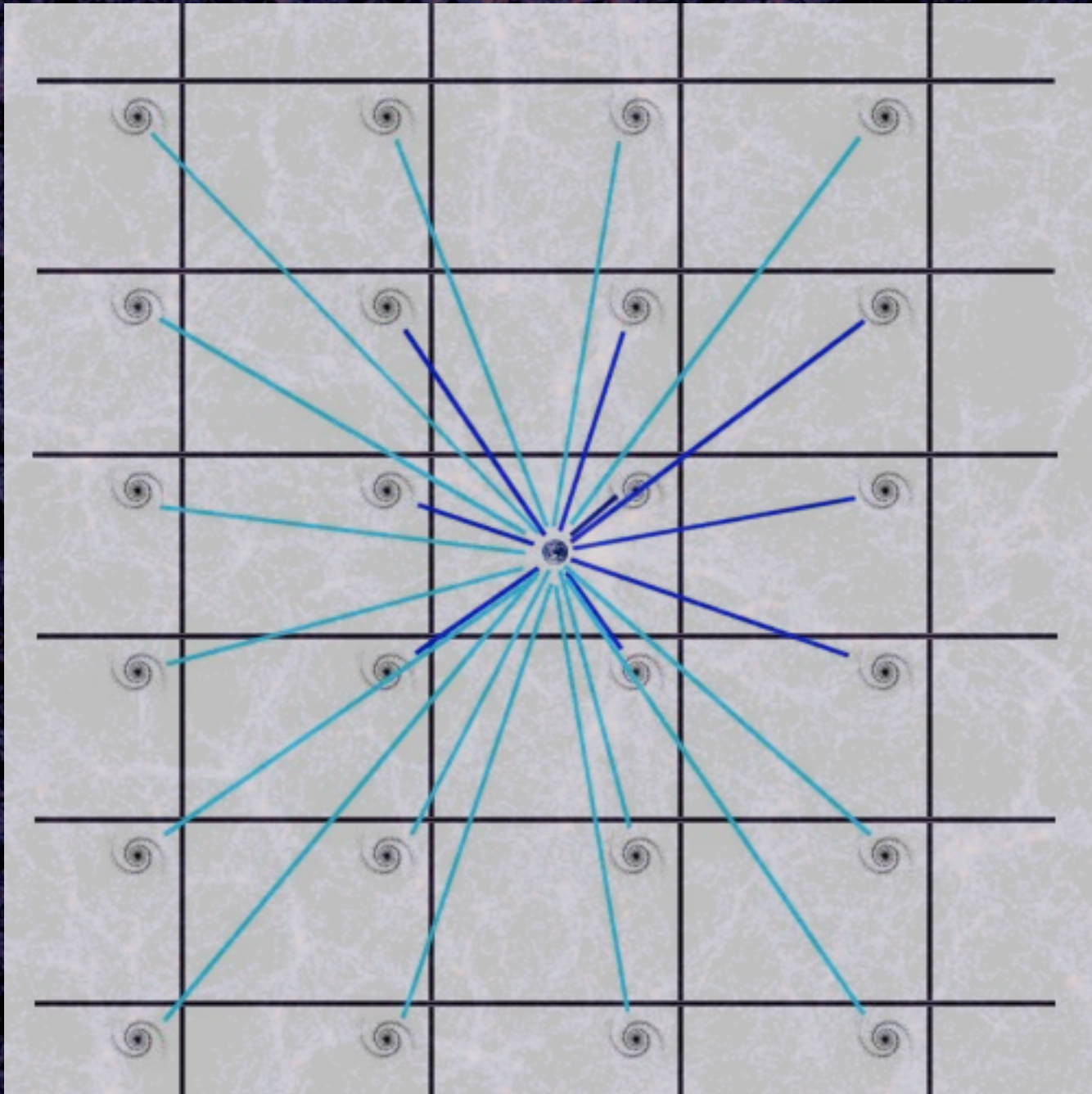


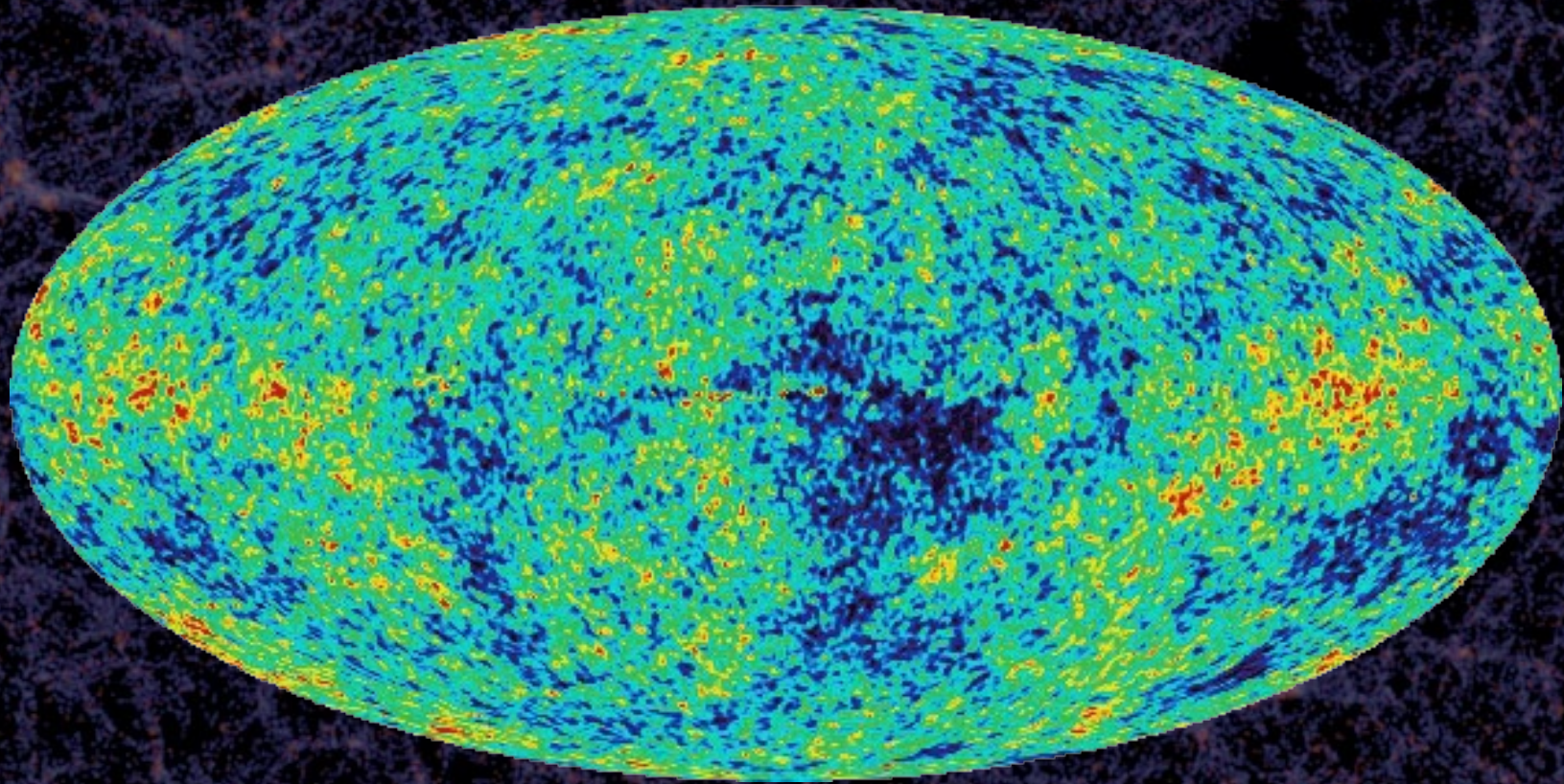


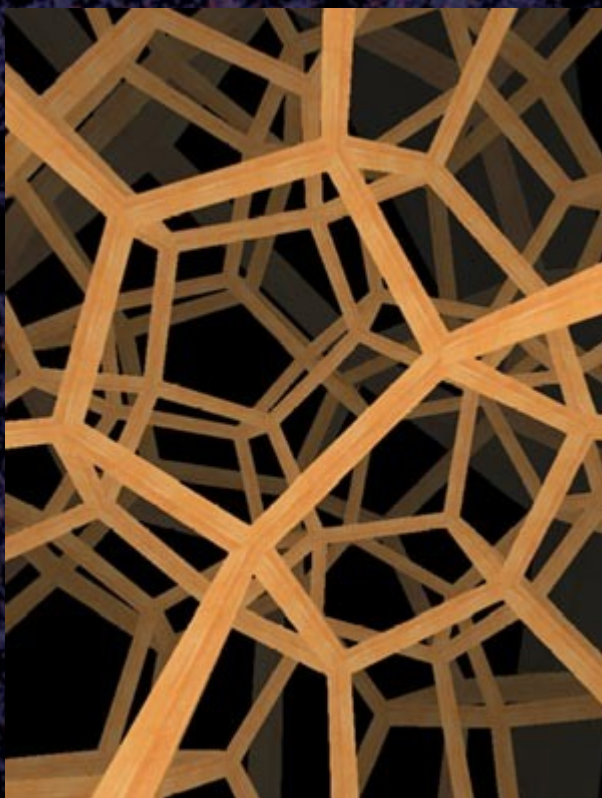


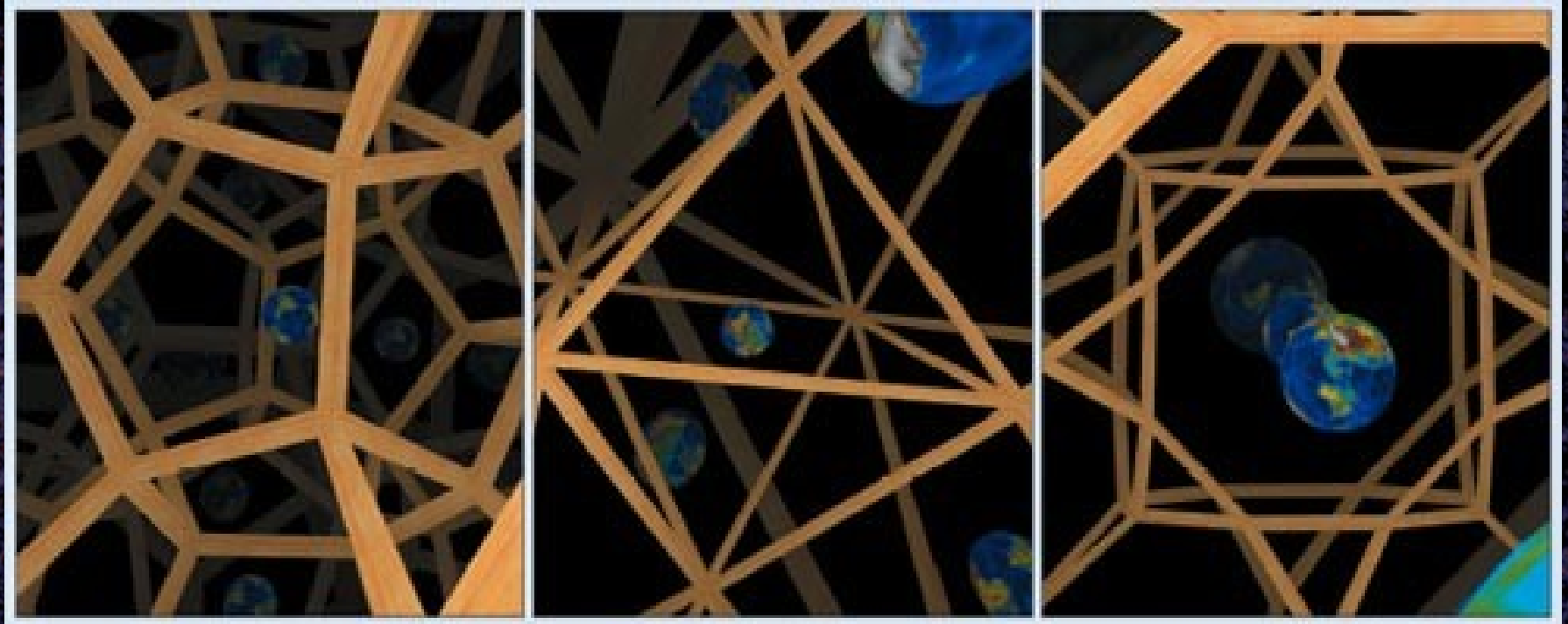












working with ambiguity

cosmology is an application of geometry

that takes on board quantum-mechanical uncertainty

to describe a space in which we might exist



working with ambiguity

music is an application of mathematics

that assumes an intangible aesthetic

to contextualise a space in which we might exist

and increasingly utilises the Scientific Method (repeatable experimentation)



working with ambiguity

acousmatic transformations alter our world

enabling a personal redefinition of space

and the creation of topologies in which we may exist

convergence of complex systems
::maths::art::physics::music::
::intermediation of perception

mashematics

:: messing with the languages of structure
:: moving beyond sonification
:: re-interpret the framework itself

On cosmology

“a system of beliefs
leading to an explanation
of the mystery of existence”

Sandage, 1987

“The logician's dream that man
should communicate only by
unambiguous digital signals
has not come true and is not
likely to”

Bateson, 1968

NGC 4501
IPC, B

Gavin Starks B.Sc. M.Mus.

<http://www.dgen.net>
gavin@dgen.net

d::gen network collaborators
Andrew Newsam (Astrophysics + Software)
Aidan Keane (Cosmology)