

## **Four States of Space Replacing Spacetime**

**Richard Fiene PhD**

**April 2023**

Space and time have gone through various views in physics from Newtonian's absolute conceptualization of space and time to Einstein's relative conceptualization of spacetime. I would like to propose a further conceptualization of space and time in just dealing with space without the need for time.

I am proposing space as represented by four states: stationary, moving, empty and filled.

Let me elaborate on each of these.

Stationary space is as it says, it is empty space that is not moving but as we know the universe is expanding and it is accelerating in its expansion. So empty space as we define it is not stationary. In fact, the only place where space is not moving is in a black hole in which space becomes a singularity. Black holes are like the anchors of the universe allowing it to expand in a controlled fashion, not expanding out of control.

Moving space is my replacement for time. Since the universe is in constant expansion mode it is relatively easy to replace time with this movement of empty space. It is linear, measurable and all pervasive. The interesting nuance with this expansion is its acceleration which will need to be dealt with since each measurement of empty space moving will increase with each successive expansive move.

Empty space is empty space, it is a vacuum. Are there particles present, yes, but it is absent of any filled space which is just another term for mass. Empty space is the background, it is the canvas upon which filled space is painted. It tells mass how to move.

Filled space is mass/matter. It is us, it is the planets, it is the stars. It tells empty space how to curve. The interaction of filled space and empty space is our definition of gravity. It is this unique geometry that demonstrates how filled space fits within empty space. No forces are needed, just the geometric description of the interaction of filled and empty space.

The interesting expansion of filled space within empty space and taking gravity to its extreme is when gravity forms a black hole and space becomes stationary which is the first state of space as mentioned above.

I think this proposal dealing only with space and not introducing time into the conceptual mix simplifies the paradigm of understanding our basic components of physical reality. No two moments are the same because space is in a constant state of expansion leaving what we just experienced behind and moving forward. Expanding space gives us an easy interpretation of past, present and future.

The four states of space are more parsimonious in explaining the fundamental pillars of physics when it comes to gravity, space, time, and mass.