An axiomatic review of anisotropic quantum gravity

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Abstract

In Newton's and Einstein's theory, all mass gravitates in an *isotropic* (spherical) manner. In this paper, we will consider aspherical – *anisotropic* – gravitating processes. We discuss dark matter, as well as dark energy and the possibility of a final, 5th interaction.

1 Questions

In this paper we will address the following three big questions:

1. The hierarchy problem: why is gravitation so weak?
2. The dark matter problem: why is gravitation stronger than that predicted by general relativity in dusts such as the Galactic disc?
3. The dark energy problem: why is the Universe's expansion accelerating?

2 Axioms

Here we provide a list of 11 axioms regarding gravitation:

1. The gravitational field is quantized into gravitons.
2. The gravitational field causes gravitational time dilation.
3. Speed causes kinematic time dilation.
4. Physical processes are interruptible, and are indeed interrupted when undergoing time dilation.
5. Physical processes are computations.

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Table 1: Table of interactions, including a 5th interaction.

Type	Inherent spatial dimension	Communication spatial dimension
Gravitation (isotropic)	3	4
Gravitation (oblate)	2	3
Gravitation (prolate)	1	2
Weak	0	1
Electromagnetism	1	0
Strong	2	1
5th interaction	3	2

6. Processes undergoing heavy time dilation due to speed are deflected twice as much as in Newtonian gravitation – for neutrinos and photons, there is (practically) no internal process occurring to resist the gravitational attraction.

7. Computations can be optimized, so there is time contraction and length dilation to consider.

8. The number of gravitational degrees of freedom of a mass is finite.

9. There is no gravitational shadow – the relaying of gravitons is the cause of gravitational time dilation.

10. Gravitationally-bound, pressure-free dusts, such as the Galactic disc, have fractional dimension – as the dimension reduces, the strength of the gravitation increases.

11. The self-optimization of the Universal process over time leads to length dilation, in the form of expansion – the antithesis of attractive gravitation.

3 Results

We have constructed Table 1 by first taking into account the inherent 2-D nature of the strong interaction, and its 1-D communications (e.g. some Wilson lines). Next, we extrapolate all the way up, to where isotropic gravitation is inherently 3-D, with 4-D communication (e.g. *the* Wilson hypervolume). Finally, the possibility of a 5th interaction follows suit, in order to bring balance to the interactions in terms of their inherent spatial dimension.

Note that, unlike with the many Wilson lines per process, there is only one Wilson hypervolume, shared by all processes. This means that gravitational interactions are *connectionless* – isotropic gravitation is *broadcast*; there is no specific recipient (e.g. everyone is a target). On the other hand, the strong interactions are more directed, and *connected* – strong interaction is *unicast* or *multicast*; there is a specific recipient (e.g. not everyone is a target). For instance, the transition from broadcast transmission to directed transmission occurs as dark matter is factored in (e.g. as $1 < D < 3$). Connectedness is an attribute of the non-gravitational interactions (e.g. weak, electromagnetic, strong, and 5th interaction).

Let's try to ask some good, if not elementary, questions:

- Does the Universe have exactly three inherent spatial dimensions? If so, then is the Universe finite and closed (e.g. a 3-sphere in the Wilson hypervolume)?
- Is a 5th interaction the same tetrahedral process that is predicted by (Wilson) loop quantum gravity [17]? If so, then are superstring theory and loop quantum gravity fundamentally compatible?
- Do gravitons undergo Shapiro time delay? If so, then are graviton condensates naturally cold?
- Is a photon a gas of constituent particles related to a 5th interaction?

4 Conclusion

To answer the questions from the first section:

1. Why is gravitation so weak? Because it's isotropic.
2. Why is gravitation stronger than that predicted by general relativity in dusts such as the Galactic disc? Fractional dimension.
3. Why is the Universe's expansion accelerating? Accelerating computational self-optimization.

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```
#include <iostream>
using namespace std;

int main(void)
{
    const double c = 299792458; // Speed of light in vacuum
    const double G = 6.674e-11; // Gravitational constant
    const double M = 1e41; // Galactic bulge mass

    const double start_distance = 6.1495e19; // Galactic bulge radius
    const double end_distance = 1e21; // just past the solar radius

    double v = sqrt(G * M / start_distance); // Speed with dark matter

    const size_t resolution = 10000;

    const double step_size = (end_distance - start_distance) / (resolution - 1);

    for (double r = start_distance; r <= end_distance; r += step_size)
    {
        const double v_N = sqrt(G * M / r); // Speed without dark matter

        if (v < v_N)
            v = v_N;

        const double D = 3.0 - log(v / v_N) / log(c);

        cout << r << " " << D << endl;
    }

    return 0;
}
```

Figure 1: C++ code for galactic orbit. Here D represents dimension.