Fine structure constant for gravity or do we feel gravitons

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Abstract: This paper presents an estimate of gravitational fine-structure constant

On April 10, 2019 I saw a message in Google news about the registration of a surge of gravitational waves with updated LIGO detectors. LIGO employees managed to double the already extremely high sensitivity of the detector. Now they hope almost every week to register bursts from the most amazing events of the Universe today - mergers of black holes and neutron stars. :)

It seemed to me interesting to estimate the fine structure constant for gravity and to compare with the same for electromagnetism. The evaluation was made from ordinary considerations of dimensions and similarity - every engineer is familiar with the similarity criteria. The figure shows a fragment of the Mathcad-file, illustrating the assessment. I like Mathcad - it allows you to work with dimensions. Comparing the values of the constants, it is easy to feel how much the gravitational interaction is weaker than the electromagnetic one. Even a single photon can be seen with the eye, but gravitons, it seems, if they register, then with some kind of supersensitive, resonantly working organ. :)

$\varepsilon_0 = 8.854 \times 10^{-12} \frac{s^4 \cdot A^2}{kg \cdot m^3}$ $G_N := 6.6742 \cdot 10^{-11} \cdot \frac{m^3}{kg \cdot sec^2}$

$h := 6.6260693 \cdot 10^{-34} \cdot J \cdot s$ $c = 2.998 \times 10^8 \frac{m}{s}$ $e_e := 1.60217653 \cdot 10^{-19} \cdot C$

$h_g := 3 \cdot 10^{-56} J \cdot s$ $u_g := 9 \cdot 10^{21} \frac{m}{s}$ $m_e := 9.1093826 \cdot 10^{-31} \cdot kg$

$h \cdot c = 1.986 \times 10^{-25} J \cdot m$ $\frac{e_e^2}{2 \cdot \varepsilon_0} = 1.45 \times 10^{-27} J \cdot m$

$h_g \cdot u_g = 2.7 \times 10^{-34} J \cdot m$ $m_e^2 \cdot G_N = 5.538 \times 10^{-71} J \cdot m$

$\frac{e_e^2}{2 \cdot \varepsilon_0 \cdot h \cdot c} = 7.297 \times 10^{-3}$ electromagnetic fine-structure constant

$\frac{m_e^2 \cdot G_N}{h_g \cdot u_g} = 2.051 \times 10^{-37}$ gravitational fine-structure constant