There Is No Need for Big G in Einstein's Field Equation! Newton Swapped with Max Planck

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Einstein's field equation [1] is given by

$$R_{\mu v} - \frac{1}{2} g_{\mu v} R = \frac{8\pi G}{c^4} T_{\mu v} \tag{1}$$

and this can be written as

$$R_{\mu v} - \frac{1}{2} g_{\mu v} R = \frac{8\pi l_p}{m_p c^2} T_{\mu v} \tag{2}$$

In other words, Einstein's field equation can also be transcribed independent of big G. Certainly, some physicists may protest, claiming that it is essential to know big G in order to find the Planck length, [2, 3, 4]. However, this is incorrect, as shown by [5]. See also [6].

Furthermore, if one knows the Planck length and the Planck constant, then one also knows the Planck mass. Newton's gravitational constant is a composite constant that consists of the more fundamental constants c, $\hbar$, and the Planck length, $G = \frac{l_p^2 c^3}{\hbar}$. See [7].

The big question is: Would Einstein prefer to rely more on Max Planck and less on Isaac Newton, or not? Well, to get the $E = mc^2$ formula embedded neatly in his field equation, I think he would be happy to swap Newton for Planck.

References

[1] A. Einstein. Näherungsweise integration der feldgleichungen der gravitation. *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften Berlin*, 1916.

[2] I. Newton. *Philosophiae Naturalis Principia Mathematics*. London, 1686.

[3] H. Cavendish. Experiments to determine the density of the earth. *Philosophical Transactions of the Royal Society of London, (part II)*, 88, 1798.

[4] M. Planck. *The Theory of Radiation*. Dover 1959 translation, 1906.

[5] E. G. Haug. Can the Planck length be found independent of big G ? *http://vixra.org/abs/1702.0263*, 2017.

[6] E. G. Haug. The gravitational constant and the Planck units. A simplification of the quantum realm. *Physics Essays Vol 29, No 4*, 2016.

[7] E. G. Haug. Planck quantization of Newton and Einstein gravitation. *www.International Journal of Astronomy and Astrophysics, Vol 6, No 2*, 2016.