**Master Draft – B**

I propose that a massive object induces a “field” in the surrounding space. When light travels through this “field,” the momentum of the light is shifted in an additive and linear manner – in accordance with the following equation:

Δ*p*=∫*pathp*⃗ ⋅*dl*⃗

where we integrate along the path of the light-ray and p is defined as

*p*⃗ =*r*^*Gm*ℏ*r*2

in units where c = 1.

**Bending of light.**

We imagine a light ray that emanates from a distant star, passes close-by a massive object, and then continues beyond the star to an observer. The closest point while passing, i.e. the impact parameter, is at a distance of b. For ease of calculation, we will say that both the point of emanation and the observer are infinitely far from the massive object.

We assume that to a first-order approximation the trajectory of the light-ray is a straight line. To calculate the change in momentum of the light-ray, we simply integrate along the straight-line path of the light ray:

Δ*p*=∫*p*⃗ ⋅*dl*⃗ =∫+∞−∞*Gm*ℏ*r*3  *r*⃗ ⋅(*ωdz*⃗ )

Because of the symmetry in the problem, we can easily calculate the change in momentum in the direction perpendicular to the direction of travel:

Δ*py*=∫+∞−∞*b*  *Gm*ℏ(*z*2+*b*2)3/2  *ωdz*

This yields:

Δ*py*=ℏ*ω*2*Gmb*

We therefore get:

*θ*≈Δ*pypz*=2*Gmb*

which yields this deflection angle:

*α*=4*Gmb*

This is the same result as in the theory of General Relativity.

**Blue/Red-shift of light**

Using the same assumptions as above, we can calculate the blue-shift of light. As a light-ray falls into a gravitational well, the momentum and hence the energy of the light-ray is shifted. Because the energy of a light-ray is generally expressed as a frequency, we say that the frequency of light observed at infinity is changed compared to when it is observed in a gravitational field at a distance *R* from the center of the massive object. We use the following equation to express this change:

ℏ*ω*′=ℏ*ω*+Δ*p*

To calculate the change in momentum, we again integrate along the path of the photon:

Δ*p*=∫*R*∞*p*⃗ ⋅*r*^*ωdr*=∫*R*∞*Gm*ℏ*r*2*ωdr*=ℏ*ωGmR*

This yields:

ℏ*ω*′=ℏ*ω*(1+*GmR*)

In the theory of General Relativity the equation is given as:

ℏ*ω*′=ℏ*ω*1(1−2*Gm*/*R*)1/2

Einstein’s equation approaches my answer ***?only?*** in the "weak gravitational limit". This could be a testable difference between my theory and Einstein's theory.