202(7): Refutation of the Integral Evaluation of Light Deflection given by Wald, attributed incorrectly to Einstein.

The method is based on the commonly known "Schwarzschild" metric, in fact the line element:

$$ds^2 = \left(1 - \frac{2MG}{c^2 r}\right)c^2 dt^2 - \left(1 - \frac{2MG}{c^2 r}\right)^{-1} dr^2 - r^2 d\Omega^2 \quad -(1)$$

In the plane:

$$dZ^2 = 0 \quad -(2)$$

it reduces to:

$$d\Omega^2 = d\theta^2 \quad -(3)$$

Wald uses reduced units:

$$m = \frac{MG}{c^2} \quad -(4)$$

He attempts to evaluate the integral:

$$\Delta\phi = 2\int_0^{1/R_0} \left(R_0^{-2} - 2mR_0^{-3} - u^2 + 2mu^3\right)^{-1/2} du \quad -(5)$$

using the incorrect method:

$$\left.\frac{\partial(\Delta\phi)}{\partial m}\right|_{m=0} =? \; 2\int_0^{1/R_0} \left.\frac{(R_0^{-3} - u^3)\, du}{\left(R_0^{-2} - 2mR_0^{-3} - u^2 + 2mu^3\right)^{3/2}}\right|_{m=0} \quad -(6)$$

However, m is a constant, so:

$$\frac{\partial(\Delta\phi)}{\partial m} = \frac{\partial(\Delta\phi)}{\partial x}\frac{\partial x}{\partial m} = \infty \quad -(7)$$

because

2)

$$\frac{\partial M}{\partial x} = 0 \quad -(8)$$

where x is any variable of calculus, and such a method violates elementary calculus.

Eq. (6) is completely incorrect,

The rest of the calculation is sequentially absurd.

It claims that:

$$\left.\frac{\partial(\Delta\phi)}{\partial M}\right|_{M=0} = 2\int_0^{1/b} \frac{(b^{-3}-u^3)}{(b^{-2}-u^2)}\,du = \frac{1}{4b} \quad -(9)$$

so:

$$\delta\phi = \Delta\phi - \pi \sim M\left.\frac{\partial(\Delta\phi)}{\partial M}\right|_{M=0}$$
$$= \frac{4M}{b} = \frac{4MG}{c^2 R_0} \quad -(10)$$

The factor π in eq. (10) is also erroneous, as shown in note 202(6). Eq (10) is erroneously described as "twice the Newton value", but it is not, as previous notes for UFT202 show. The line element (1) does not produce a precessing ellipse as shown in notes 202(3) and 202(4):

$$\left(\frac{x\epsilon}{d}\right)^2 \sin^2(x\theta) \neq \frac{1}{b^2} - \left(1 - \frac{r_0}{r}\right)\left(\frac{1}{a^2} + \frac{1}{r^2}\right) \quad -(11)$$

as in eq. (9) of note 202(4).

Additionally,

$$\frac{\partial m}{\partial(\Delta\phi)} = 0 \qquad -(12)$$

because m is a constant; so in eq. (9)

$$\left.\frac{\partial m}{\partial(\Delta\phi)}\right|_{m=0} = 4b \overset{?}{=} 0. \qquad -(13)$$

This means that in eq. (10):

$$\delta\phi \overset{?}{\rightarrow} \infty. \qquad -(14)$$

<u>Conclusion</u>

Einstein's calculation is riddled with basic errors.