The Sagnac effect in m theory

M. W. Evans[*], H. Eckardt[†]
Civil List, A.I.A.S. and UPITEC

(www.webarchive.org.uk, www.aias.us,
www.atomicprecision.com, www.upitec.org)

December 30, 2018

3 Graphics of the Sagnac effect for various m functions

According to Eq. (14) the time difference measured by a Sagnac interferometer rotated in two directions is

$$\Delta t = \frac{4\pi\Omega}{\omega^2 \ \mathrm{m}(r) - \Omega^2} \tag{20}$$

where ω is the angular frequency of the light and Ω is that of mechanical rotation. The time difference will depend on the distance r from the gravitational centre if $\mathrm{m}(r)$ sufficiently differs from unity in the radial range investigated. Eq. (20) has been evaluated graphically for a demo system in Fig. 1. The model m function is that derived from Einsteinian theory:

$$\mathrm{m}(r) = 1 - \frac{r_S}{r} \tag{21}$$

with so-called Schwarzschild radius

$$r_S = \frac{2MG}{c^2} \tag{22}$$

where M is the gravitating mass. From Fig. 1 it can be seen that Δt has a pole at $r = r_S$, however r_S normally lies inside the gravitating body so that we always have $r \gg r_S$ where $\mathrm{m}(r)$ is nearly unity. Correspondingly, the time differences to be expected are small and are determined by the right hand side asymptotic value which is

$$\Delta t \rightarrow \frac{4\pi\Omega}{\omega^2 - \Omega^2}. \tag{23}$$

Values of Δt for some celestial bodies are listed in Table 1. We assumed $\Omega = 10^4$/min and $\omega = 10^{15}$/s, i.e. for a Sagnac interferometer with optical fibres.

*email: emyrone@aol.com
†email: mail@horst-eckardt.de

body	m [kg]	r_S [m]	r [m]	Δt [s]
earth	5.97219e24	0.00887	6.371009e6	1.32e-26
sun	1.98855e30	2953	6.95508e8	1.32e-26
galactic centre	8.36e36	1.24e10	1.24e11	1.46e-26

Table 1: Parameters of Sagnac effect for $\omega = 10^15/\mathrm{s}$, $\Omega = 10^4/\mathrm{min}$.

When measured at the surface of the earth and (hypothetically) at the surface of the sun, it is seen that the result is $\Delta t = 1.32 \cdot 10^{-26}$ s in both cases. This means that the time difference is determined by the interferometric limit (23) and no dependence on r is detectable any more. Even when inspecting the case of the galactic centre, which is an extremely heavy star with a Schwarzschild radius of 10^{10}m, the time difference would already be in saturation at the ten-fold distance of this radius.

In order to obtain well measurable time differences one would have to reduce the frequency of electromagnetic radiation in the interferometer drastically. The time difference depends on the inverse square of ω. We have graphed the dependence of Δt from ω for a fixed earth radius in Fig. 2. The curves are presented on logarithmic scales. Obviously the radiation frequency has to be lowered to the MHz range to obtain time differences in the range of 10^{-8}s. For comparison we have added a curve for a different m function (exponential function) we used in preceding UFT papers:

$$\mathrm{m}(r) = 2 - \exp\left(\log(2)\exp(-\frac{r}{R})\right). \tag{24}$$

We had to increase the parameter R to 10^7m to obtain a visible difference in the diagram. Practical measurements of $\mathrm{m}(r)$ seem to be a hard challenge for an experiment.

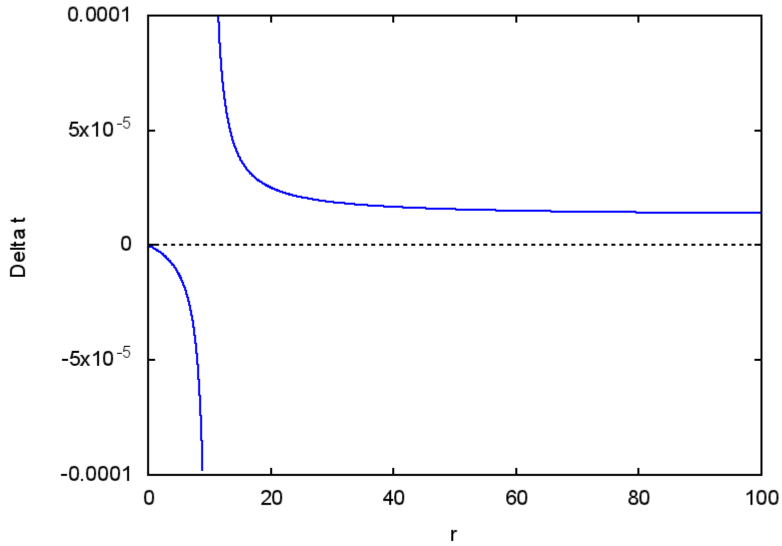

Figure 1: Principal dependence of Sagnac effect on r.

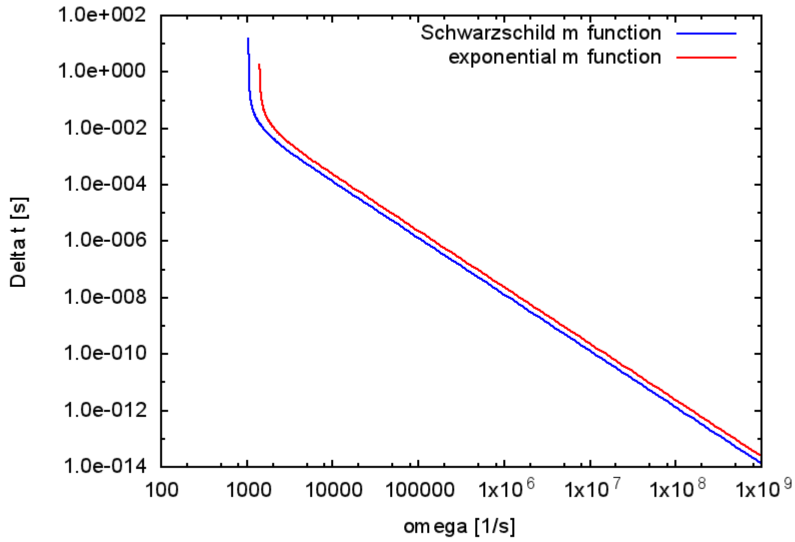

Figure 2: Dependence of Sagnac effect on ω at earth surface.