124. A Fact, Which is Unfavorable to the Theory of General Relativity of A. Einstein

By Tsurusaburo TAKASU

(Comm. by Z. SUETUNA, M.J.A., Oct. 12, 1956)

As for the theory of special relativity of A. Einstein, except for the *author's three-dimensional Laguerre-geometrical interpretation,*[1] *which is at the same time a concrete physical interpretation,* there remains no question. As for the theory of general relativity of A. Einstein and his generalized gravitation theory of 1953,[2] their situations are quite different. In this note *a fact extremely unfavorable to the former* will be pointed out and then it will be shown that *the latter implies a self-contradiction,* being thus lead to the *actual theory* as the author's three-dimensional non-holonomic Laguerre fibre bundle geometry[5] realized in the ordinary three-dimensional Cartesian space teleparallelismically torsioned by the nascency of an (in general non-holonomic) action field caused by the charge of a particle.

1. *Preliminaries.* When a particle without charge lies in the three-dimensional Cartesian space, it may be represented by a geometrical point (x^i, $i=1,2,3$: Cartesian). But so soon as it gets charged, it emits some energy with components $\omega^l/dt=\omega^l_\mu(x^\lambda)dx^\mu/dt$, say, in unit of time, so that the ω^l are the components of the action, $l,\lambda,\mu=1,2,3,4$. Let ω^l be an orthogonal system thereby. Then the metric

$$dS^2=\omega^l\omega^l=g_{\mu\nu}dx^\mu dx^\nu,\ (\lambda,\mu,\nu,\cdots=1,2,3,4),\ |\omega^l_\mu|\neq 0$$

arises, where the dS is the resultant action and the ω^l are of invariant forms, so that hereafter the x^λ may be considered to be curvelinear coordinates. Thereby the summation convention is: $A^lB^l\equiv A^4B^4-A^iB^i$, $(i=1,2,3)$. Evidently the ω^l_μ are the covariant components of the momentum, the fourth ω^l_4 being the statical potential, when the x^4 is the time t. For the ω^l_μ arisen, we obtain the contravariant components Ω^λ_l of the momentum by the conditions:

$$\omega^l_\mu\Omega^\lambda_l=\delta^\lambda_\mu,\quad \Omega^\lambda_m\omega^l_\lambda=\delta^l_m.$$

Utilizing the Dirac matrices $\gamma_1,\gamma_2,\gamma_3$ and $\gamma_5(\gamma_h\gamma_k+\gamma_k\gamma_h=2\delta_{hk};\ h,k=1,2,3,5)$ with $\gamma_4=i\gamma_5$, we put

$$d\boldsymbol{S}=\gamma_l\omega^l,\quad (dS^2=-d\boldsymbol{S}d\boldsymbol{S}=\omega^l\omega^l),\quad (|d\boldsymbol{S}|=dS),$$

whence we obtain the following relations:

$$g_{\mu\nu}=g_{\underline{\mu\nu}}+g_{\underset{\vee}{\mu\nu}},\quad g_{\underline{\mu\nu}}=g_{\underline{\nu\mu}},\quad g_{\underset{\vee}{\mu\nu}}=-g_{\underset{\vee}{\nu\mu}},\quad g_{\underline{\mu\nu}}=\omega^l_\mu\omega^l_\nu,$$

$$g_{\underset{\vee}{\mu\nu}}=\gamma_4\gamma_1(\omega^4_\mu\omega^1_\nu-\omega^1_\mu\omega^4_\nu)+\cdots+\gamma_2\gamma_3(\omega^2_\mu\omega^3_\nu-\omega^3_\mu\omega^2_\nu)+\cdots,$$

$$g^{\underline{\mu\nu}}=\Omega^\mu_l\Omega^\nu_l,\quad \omega^l_\mu=g_{\underline{\mu\nu}}\Omega^\nu_l,\quad \Omega^\lambda_l=g^{\underline{\lambda\mu}}\omega^l_\mu.$$