Equation (20) must hold for all values of the indices j and m, and for every function $\varphi(\lambda) \in D'$; in particular, if λ_0 denotes any fixed value of λ, (20) must be verified if one sets $\varphi(\lambda) = (\lambda - \lambda_0 - i)(\lambda - \lambda_0 + i)\exp(-\lambda_0^2)$, and this implies $A^{j,m}(\lambda_0) = A^{j,m}(-\lambda_0)$. Thus, since λ_0 is arbitrary, every function $A^{j,m}(\lambda)$ is an even function of its argument, and the operator of multiplication by $A^{j,m}(\lambda)$ commutes with R. Next, from the explicit form of the matrix elements $\mathfrak{T}^{j,m}_{0j,m}$ and $\mathfrak{T}^{j,m}_{3j,m}$ it is obvious that the operator $\exp(i\mathfrak{D})$ can be expressed in the form

$$\exp(i\mathfrak{D}) = f_0^{j,m}(\lambda)\mathfrak{T}^{j,m}_{0j,m} + f_3^{j,m}(\lambda)\mathfrak{T}^{j,m}_{3j,m} + g^{j,m}(\lambda)R \tag{21}$$

with a suitable choice of the function $f_0^{j,m}$, $f_3^{j,m}$ and $g^{j,m}$, so that the commutativity of the operator of multiplication by $A^{j,m}(\lambda)$ with $\mathfrak{T}^{j,m}_{0j,m}$, $\mathfrak{T}^{j,m}_{3j,m}$ and R implies that $A^{j,m}(\lambda)$ commutes with $\exp(i\mathfrak{D})$: but this is only possible if the functions $A^{j,m}(\lambda)$ are constants, as one can prove by reproducing the argument used in sect. I-8 to obtain a strictly analogous result. Finally, the commutativity of $\mathcal{A}$ with $\mathcal{N}_3$ implies that the constants $A^{j,m}$ must all coincide, and the proof is completed.

9. – The unitary representations of $\mathfrak{P}$ with zero mass and spin $\frac{1}{2}$.

If $b(\lambda) = c(\lambda) = 0$ and $a(\lambda)$ is such that the operators are self-adjoint, i.e. satisfies the identity $\bar{a}(\lambda + i) \equiv a(\lambda)$, the corresponding representations of $\mathfrak{P}$ can be shown as above to be irreducible, and the eigenvalues of $\mathfrak{T}^2$ and W both vanish.

It is known (*) that in this case the helicity operator $\sum_i \mathfrak{T}_i\mathcal{M}_i/\mathfrak{T}_0$ is a multiple of the identity and its value turns out to be $\frac{1}{2}$ in our case. Thus all the representations corresponding to (18) are mutually equivalent.

The same considerations apply to the representations corresponding to (19), except that the value of the helicity is $-\frac{1}{2}$ in this case.

(*) Cfr. SCHWEBER [4], p. 51.

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[2] E. WIGNER, Ann. Math., **40** (1939), p. 149.
[3] H. JOOS, Forschr. Phys., **10** (1962), p. 65.
[4] S. SCHWEBER, *An Introduction to Relativistic Quantum Field Theory*, Harper and Row, New York, 1964.

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p. 365, line 1 instead of: (N_{01}, N_{02}, N_{03}) read: (M_{01}, M_{02}, M_{03})

p. 365, line 8 instead of: $F = -\frac{1}{2}M_{ab}M^{ab}$ read: $F = -\frac{1}{4}M_{ab}M^{ab}$

p. 374, line 23 read: $\mathfrak{T}^{j*}[\varphi] = \left\{2C_j\mathfrak{T}^{j-1}\left[\frac{1}{C_j}\varphi\right] - C_jC_{j-1}\mathfrak{T}^{j-2}\left[\frac{1}{C_jC_{j-1}}\varphi\right]\right\}$

p. 375, end of line 29, remove the comma and insert: and $\psi(\lambda) = q(\lambda)\exp[-\lambda^2]$