1) 136(1): Development of the Tetrad Postulate and ECE Lemma in SU(2) Representation Space.

The tetrad postulate is:

$$D_\mu q^a_\nu = 0 \quad -(1)$$

and is fundamental to geometry. It can be re-expressed as the ECE Lemma:

$$\square q^a_\nu := R q^a_\nu \quad -(2)$$

where:

$$R = q^\lambda_a \partial^\mu (\Gamma^a_{\mu\lambda} - \omega^a_{\mu\lambda}). \quad -(3)$$

In paper 135 it was shown that eq. (2) is:

$$\sigma^\mu p_\mu q^R_1 = \sigma^0 p_0 q^L_1 \quad -(4)$$

$$\sigma^\mu p_\mu q^R_2 = \sigma^0 p_0 q^L_2 \quad -(5)$$

where

$$q^a_\mu = \begin{bmatrix} q^R_1 & q^R_2 \\ q^L_1 & q^L_2 \end{bmatrix}, \quad -(6)$$

$$\sigma^\mu = (\sigma^0, \sigma^i) \quad -(7)$$

$$p_\mu = (p_0, -p_i). \quad -(8)$$

The Pauli matrices form an SU(2) Lie algebra:

$$\left[\frac{\sigma_i}{2}, \frac{\sigma_j}{2} \right] = i \frac{\sigma_k}{2} \quad -(9)$$

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2) Eqs. (4) and (5) are equations of the unified field in SU(2) representation space. This means that any component of the unified field can be developed in SU(2) representation space. This argument can be extended to an SU(n) representation space. The unified field can therefore be developed in any representation space.

To date, the development of field theory in SU(2) has been restricted to the free fermion, where:

$$R = -\left(mc/\hbar\right)^2 \quad -(10)$$

$$\lambda_c = \hbar/mc \quad -(11)$$

where λ_c is the Compton wavelength. The free fermion is the fermion free of the influence of any other component of the unified field, such as gravitation or electromagnetism. When the fermion interacts with any other component of the unified field, R is defined by eq. (3).

Now use in eqs. (4) and (5):

$$p_\mu = i\hbar\,\partial_\mu \quad -(12)$$

to obtain:

$$i\sigma^\mu \partial_\mu \phi_1^R = |R_0|^{1/2} \sigma^0 \phi_1^L \quad -(13)$$

$$i\sigma^\mu \partial_\mu \phi_2^R = |R_0|^{1/2} \sigma^0 \phi_2^L \quad -(14)$$

where:

$$|R_0|^{1/2} = mc/\hbar \quad -(15)$$

and:

$$p_0 = mc = \hbar |R_0|^{1/2} \quad -(16)$$

Write eq. (16) as:

$$p_0 = \hbar |R_0|^{1/2} e_0 \quad -(17)$$

where the e_0 timelike unit vector is part of:

$$e_\mu = (e_0, -e_i) \quad -(18)$$

Finally generalize eq. (17) to:

$$\boxed{p_\mu = \hbar |R|^{1/2} e_\mu} \quad -(19)$$

From eqs. (12) and (19):

$$\boxed{\partial_\mu = -i |R|^{1/2} e_\mu} \quad -(20)$$

However, ∂_μ is the basis vector for the coordinate adapted representation of ~~Car~~ differential geometry. Eq. (20) therefore traces the origin of quantum mechanics to the curvature R of the ECE lemma. The fermion equation is:

$$\boxed{\begin{aligned} \sigma^\mu e_\mu |R|^{1/2} \phi_1^R &= \sigma^0 e_0 |R_0|^{1/2} \phi_1^L \\ \sigma^\mu e_\mu |R|^{1/2} \phi_2^R &= \sigma^0 e_0 |R_0|^{1/2} \phi_2^L \end{aligned}} \quad -(21)$$

Eq. (21) is straightforwardly extended to $SU(n)$