DERIVATION OF THE DIRAC EQUATION, SIMPLE SUMMARY

Start with the definition of the 2×2 tetrad q

$$\boxed{\xi^a = q^a_\mu \, \xi^\mu} \quad -(1)$$

where ξ^a is a two-spinor in the tangent bundle and ξ^μ a two-spinor in the Evans spacetime.

Thus:

$$\begin{bmatrix} \xi^1 \\ \xi^2 \end{bmatrix} = \begin{bmatrix} q^1_{I} & q^1_{II} \\ q^2_{I} & q^2_{II} \end{bmatrix} \begin{bmatrix} \xi^{I} \\ \xi^{II} \end{bmatrix} \quad -(2)$$

$a = 1, 2 \; ; \; \mu = I, II.$

Form the column four vector or Evans spinor:

$$\psi = \begin{bmatrix} q^1_{I} \\ q^1_{II} \\ q^2_{I} \\ q^2_{II} \end{bmatrix} . \quad -(3)$$

The Evans wave equation states that:

$$(\Box + kT)\, q^a_\mu = 0 . \quad -(4)$$

Therefore:

$$\boxed{(\Box + kT)\, \psi = 0.} \quad -(5)$$

This is the Dirac equation in general relativity.

2) In the limit of special relativity the Evans least curvature principle means that:

$$kT \rightarrow \left(\frac{mc}{\hbar}\right)^2 \quad -(6)$$

Finally the structure of eqn (5) becomes the structure of the Dirac equation of special relativity when:

$$\begin{bmatrix} q_{I}^{1} \\ q_{II}^{1} \\ q_{I}^{2} \\ q_{II}^{2} \end{bmatrix} \rightarrow \begin{bmatrix} q_{I}^{R} \\ q_{II}^{R} \\ q_{I}^{L} \\ q_{II}^{L} \end{bmatrix} = \begin{bmatrix} \phi^{R} \\ \phi^{L} \end{bmatrix} \quad -(7)$$

The Pauli spinors are:

$$\phi^R = \begin{bmatrix} q_{I}^{R} \\ q_{II}^{R} \end{bmatrix} ; \quad \phi^L = \begin{bmatrix} q_{I}^{L} \\ q_{II}^{L} \end{bmatrix} \quad -(8)$$

and the Dirac spinor is:

$$\phi = \begin{bmatrix} \phi^R \\ \phi^L \end{bmatrix} . \quad -(9)$$

The Dirac equation of special relativity is:

$$\boxed{\left(\square + \left(\frac{mc}{\hbar}\right)^2 \right) \phi = 0.} \quad -(10)$$

QED