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ALTERNATIVE TWO-TENSOR THEORY *†

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We propose a general covariant massive two-tensor theory by generalizing the finite-range theory of gravitation of Freund, Maheshwari and Schönberg [1].

We obtain this two-tensor theory by making the absolute object $(\eta_{\mu\nu})$ into a dynamical one $(h_{\mu\nu})$. The theory thereby becomes generally covariant. The interaction term of the two fields $g_{\mu\nu}$ and $h_{\mu\nu}$ is given by

$$L_{gh} = m^2 \left\{ \sqrt{-g} - \frac{1}{2} h_{\mu\nu} \, g^{\mu\nu} \, \sqrt{-g} + \sqrt{-h} \right\} .$$

We point out that this theory is consistent in the sense that it leads to four unambiguous constraints [2] when ADM-formalism [3] is applied to it. In the linearized limit of this theory one can diagonalize the fields to obtain a massless field which is purely spin-2, while the other is massive containing a spin-2 and spin-0 component.

REFERENCES

1)   P.G.O. Freund, A. Maheshwari and E. Schönberg, Astrophys. J. 157, 2, 857 (1969).

2)   J.K. Lawrence and E.T. Toton, "Constraint Relations in Two-Tensor Gravity", Institute of Theoretical Physics, University of Vienna, preprint, June 1971.

3)   R. Arnowitt. S. Deser and C.W. Misner, "Gravitation", ed. L. Witten (Wiley & Sons, New York 1962).