**Sławianowski, Jan J.**; **Kovalchuk, Vasyl**
**Search for the geometrodynamical gauge group. Hypotheses and some results.** (English)
Zbl 1205.83052
Mladenov, Ivaïlo M. (ed.), Proceedings of the 9th international conference on geometry, integrability and quantization, Sts. Constantine and Elena, Bulgaria, June 8–13, 2007. Sofia: Bulgarian Academy of Sciences (ISBN 978-954-8495-42-4/pbk). 66-132 (2008).

The authors consider the concept of spinors even now as still rather mysterious, insofar as, for them, the proper choice of the 'true' gauge group responsible for the spinorial geometrodynamics is not taken. To make progress in this question they plead for giving up the standard view, according to which this group is the local group $SL(2, \mathbb{C})$, and to replace it by the group $SU(2, 2)$, earlier introduced and discussed in several papers by one of the authors (J. J. S.). For this reason, first they present basic $SL(2, \mathbb{C})$ relations and list a number of mathematical and physical difficulties arising if, on this basis, one includes the Dirac equation into the Einstein-Cartan theory of gravity. Second, it is shown that the $SU(2, 2)$ symmetry leads to the idea of the Klein-Gordon-Dirac equation which was already discovered by Barut and coworkers and which seems to explain the phenomenon of lepton-quark doublets appearing in the electroweak interaction. All over the paper the presentation relies on the compromise to formulate the basic expressions analytically, but to include also certain fibre bundle comments.

For the entire collection see [Zbl 1154.17001].

Reviewer: Horst-Heino von Borzeszkowski (Berlin)

**MSC:**

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| 83C60 | Spinor and twistor methods in general relativity and gravitational theory; Newman-Penrose formalism |
| 83D05 | Relativistic gravitational theories other than Einstein's, including asymmetric field theories |
| 83E05 | Geometrodynamics and the holographic principle |

Cited in **1** Document

**Keywords:**

spinors; gauge group; $SL(2, \mathbb{C})$; $SU(2, 2)$ groups; Dirac equation; Einstein-Cartan gravity