RIEMANNIAN $Spin(7)$ HOLONOMY MANIFOLD CARRIES OCTONIONIC-KÄHLER STRUCTURE

DMITRY EGOROV

I will talk about a new concept called octonionic-Kähler structure. Let (M, g) be a smooth Riemannian manifold. Suppose V is a 7-dimensional subbundle of the vector bundle $\mathrm{End}(TM)$ such that a fiber of V through the point is spanned by almost complex structures J_λ at that point.

I impose two constraints on V. First, there exists a non-associative product of almost complex structures. It corresponds to the octonionic product. Secondly, the following formula holds:

$$\nabla_g J_\lambda \omega_\lambda^\mu J_\mu,$$

where $\omega \in \mathfrak{g}_2 \otimes \Omega^1(M)$. The $\mathfrak{g}_2$ algebra arises naturally, since $G_2 = \mathrm{Aut}_{\mathbb{R}}(\mathbb{O})$.

The defined bundle V over M is called an octonionic-Kähler structure on manifold M or I say that M is an octonionic-Kähler manifold. Then I will introduce the following theorem.

Theorem. *Let M be a Riemannian 8-manifold with holonomy group contained in $Spin(7)$; then M is the octonionic-Kähler manifold.*

References

[1] D. Egorov, "Riemannian *Spin*(7) holonomy manifold carries octonionic-Kähler structure", *Moscow Math. J.* to appear, arXiv:1109.2281

Ammosov Northeastern Federal University, Yakutsk, Russia
E-mail address: egorov.dima@gmail.com

This work was supported in part by the Russian Foundation for Basic Research (grant 12-01-00873-a) and the Council of the Russian Federation President Grants (projects NSh-544.2012.1 and MK-842.2011.1).