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Book of abstracts

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- General and algebraic topology
- Dynamical systems and their applications
- Geometric problems in mathematical analysis
- Geometric and topological methods in natural sciences
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BPS states of Fourfolds as candidates for Kaluza-Klein modes

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Within the framework of the cosmological theory of the Big Bang, F-theory is represented that unifies all four types of fundamental interactions [1]. Among the most exciting predictions of physics beyond the Standard Model is the assumption of the space of extra dimensions [2] that solves the problem of the hierarchy of interactions. With the presence of this extra dimensions are connected the searches for Kaluza-Klein (KK) partners of gravitons, gauge bosons and microscopic black holes at the Large Hadron Collider (LHC). The theoretical models of the space of extra dimensions are models of Arkani-Hamed, Dimopoulos and Dvali and of Randall, Sundrum. In the framework of F-theory is considered the fourfold [3], as a space of extra dimensions, the choice of which is dictated by the "good" group of holonomy. We study the duality between the F-theory compactified on the K3-surface and $E8 \times E8$ heterotic string compactified on the torus T^2. The set of BPS states corresponding to the Calabi-Yau fourfolds, which has either an elliptic curve or a K3-fibration as a layer, is studied in the aspect of correspondence to the KK modes of the M-theory on $R^8 \times (S^1 \times S^1 = T^2) \times S^1/Z_2$ [4]. The singularities of the moduli space of the Calabi-Yau fourfold make it possible to observe massive KK modes [5], the masses of which are obtained from the M-theory of supergravity. The result is of interest for a theoretical understanding of the KK modes, the experimental searches for which are carried out at the LHC [6].

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