Beauville, Arnaud

Variétés kähleriennes dont la première classe de Chern est nulle. (French) Zbl 0537.53056

J. Differ. Geom. 18, 755-782 (1983).

The first part of this paper recalls the decomposition theorem for compact Kähler manifolds with $c_1 = 0$. Up to a finite covering, such a manifold splits as a product of a complex torus and compact Kähler manifolds with holonomy group SU(m) or Sp(r). Compact manifolds with holonomy SU(m) ($m \geq 3$) are projective, with trivial canonical bundle and no holomorphic p-forms for $p < m = \dim(X)$. Compact manifolds with holonomy Sp(r) are characterized by the existence of a unique (up to a scalar) holomorphic 2-form which is everywhere non-degenerate: they are called Kähler symplectic manifolds. The second part of the paper gives examples of Kähler symplectic manifolds in any (even) dimension. They are constructed from symmetric products of K3 or abelian surfaces. Then the period map for symplectic manifolds is studied. The situation is analogous to the case of K3 surfaces: the space $H^2(X, \mathbb{C})$ has a natural quadratic form, defined over $\mathbb{Z}$, and the period map is a local isomorphism from the moduli space into the quadric in $\mathbb{P}(H^2(X, \mathbb{C}))$ defined by this form.

MSC:

53C55 Global differential geometry of Hermitian and Kählerian manifolds
14J10 Families, moduli, classification: algebraic theory

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