Peternell, Thomas

A characterization of $\mathbb{P}_n$ by vector bundles. (English) Zbl 0726.14034

Math. Z. 205, No. 3, 487-490 (1990).

The following result [conjectured by *S. Mukai*; cf. "Open problems. Classification of algebraic and analytic manifolds", Proc. Symp., Katata/Jap. 1982, Prog. Math. 39, 591-630 (1983; Zbl 0527.14002)] is proved:

Theorem: Let X be a compact complex manifold of dimension n, E an ample vector bundle on X of rank $(n+1)$ satisfying $c_1(E) = c_1(X)$. Then $X \cong P_n$ and $E \cong \mathcal{O}_{P_n}(1)^{n+1}$.

The cases $n \leq 2$ are clear. Mukai proved the case $n = 3$.

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MSC:

14N05 Projective techniques in algebraic geometry
14F05 Sheaves, derived categories of sheaves, etc. (MSC2010)
57R20 Characteristic classes and numbers in differential topology

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characterization of projective space; first Chern class; extremal rational curves; ample vector bundle

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