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WILLIAM M. KANTOR

BULLETIN (New Series) OF THE
AMERICAN MATHEMATICAL SOCIETY
Volume 5, Number 2, September 1981

0002-9904/81/0000-0410/$01.75

Vector bundles on complex projective spaces, Progress in Mathematics, vol. 3, by Christian Okonek, Michael Schneider and Heinz Spindler, Birkhäuser, Boston, 1980, vii + 389 pp., $18.00 paperback.

This book is an introduction to the basic theory and classification of holomorphic vector bundles on complex projective spaces. A holomorphic vector bundle on a complex manifold M is just what you would expect: It is a locally trivial fibre space E over M with fibre $\mathbf{C}^r$ and with transition functions which are holomorphic on the base. The dimension r of the fibre is called the *rank* of the bundle.

Smooth vector bundles (that is, with C^∞ transition functions) have been known for a long time in differential geometry. They can in principle be classified by certain characteristic classes (in the case of $\mathbf{C}^r$-bundles their Chern classes) and some homotopy invariants. The study of holomorphic vector bundles is more recent, and the classification problem is of an essentially different nature because of the extra structure imposed by holomorphic functions. Once the topological type of the underlying smooth vector bundle has been fixed, one finds in general continuous families of nonisomorphic holomorphic bundles. The parameter spaces of these families are called *moduli spaces*. The classification problem thus consists of determining which smooth $\mathbf{C}^r$-bundles carry a holomorphic structure, and then describing the moduli space of the possible holomorphic bundles.

Holomorphic vector bundles on compact Riemann surfaces were studied extensively beginning in the 1960's. Then attention turned to higher-dimensional manifolds and in particular, there has been a big spurt of recent activity concerning holomorphic vector bundles on complex projective spaces, the subject of this book. The extent of this activity can be judged from the bibliography of this volume, which contains 138 items, about half of which date since 1977.

Why is this subject suddenly so popular? I see three principal reasons. One