



UNIVERSITY OF CALIFORNIA
RIVERSIDE

DEPARTMENT OF MATHEMATICS
VICTOR L. SHAPIRO DISTINGUISHED
LECTURE

DR. PAUL BAUM
PENNSYLVANIA STATE UNIVERSITY

"WHAT IS K-THEORY AND WHAT IS IT
GOOD FOR?"

#1. The basic definition of K-theory

#2. A brief history of K-theory

#3. Algebraic versus topological K-theory

#4. The unity of K-theory

This is an expository talk intended for a general mathematical audience.

WEDNESDAY, MAY 4TH, 2016
SURGE 284
TEA TIME 3:40 P.M.
TALK BEGINS 4:10 P.M.



UNIVERSITY OF CALIFORNIA
RIVERSIDE

DEPARTMENT OF MATHEMATICS
FRACTAL RESEARCH GROUP

DR. PAUL BAUM
PENNSYLVANIA STATE UNIVERSITY

“DIRAC OPERATOR”

The Dirac operator of R^n will be defined. This is a first order elliptic differential operator with constant coefficients. Next, the class of differentiable manifolds which come equipped with an order one differential operator D such that at the symbol level D is locally isomorphic to the Dirac operator of R^n will be considered. These are the Spin-c manifolds. Spin-c is slightly stronger than oriented, so Spin-c can be viewed as "oriented plus epsilon". Most of the oriented manifolds that occur in practice are Spin-c. The Dirac operator of a closed Spin-c manifold is the basic example for the Hirzebruch-Riemann-Roch theorem and the Atiyah-Singer index theorem.

THURSDAY, MAY 5TH, 2016
SURGE 268
11:10 A.M. – 12:30 P.M.



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DEPARTMENT OF MATHEMATICS
MATHEMATICAL PHYSICS &
DYNAMICAL SYSTEMS

DR. PAUL BAUM
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“ATIYAH-SINGER REVISITED”

This is an expository talk about the Atiyah-Singer index theorem.
Two low dimensional examples (Toeplitz operators on S^1 , classical Riemann-Roch) of the theorem will be considered.

The Dirac operator special case of the theorem will be proved, with the proof based on Bott periodicity.

The proof will be outlined that the Dirac operator special case implies the full theorem.

THURSDAY, MAY 5TH, 2016
SURGE 268
3:40 – 5:00 P.M.