

# TWISTED INDEX THEOREM AND TYPE III FACTORS

HITOSHI MORIYOSHI

## ABSTRACT

As is well known, the von Neumann algebras are classified into three types, namely, type I, II and III. Type III factors are further classified into type  $\text{III}_\lambda$  ( $0 \leq \lambda \leq 1$ ) according to the value  $\lambda$  determined from Connes's  $S$ -set. It is also known that there is a unique type  $\text{III}_\lambda$  hyperfinite factor  $R_\lambda$  for  $0 < \lambda \leq 1$ . Then it is interesting to study such hyperfinite factors from Geometric point of view. For instance, the type  $\text{III}_1$  hyperfinite factor can be constructed from the Anosov foliation on the unit tangent bundle of a closed surface. For  $0 < \lambda < 1$  there exist a foliated  $T^2$ -bundle  $(M_\mu, \mathcal{F}_\mu)$  on a closed surface whose foliation  $W^*$ -algebra  $W^*(M_\mu, \mathcal{F}_\mu)$  is isomorphic to  $R_\lambda$  with  $\lambda = \mu^2$ . In this talk we shall prove Twisted Index theorem on such type  $\text{III}_\lambda$  hyperfinite factors. Then we can recapture Connes's  $S$ -set via the evaluation between the twisted index and the transverse fundamental cyclic cocycles in the framework of Noncommutative Geometry.

DEPARTMENT OF MATHEMATICS, KEIO UNIVERSITY, 3-14-1 HIYOSHI, YOKOHAMA 223-8522, JAPAN

*E-mail address:* moriyosi@math.keio.ac.jp

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*Key words and phrases.* foliation, secondary characteristic class, type  $\text{III}_\lambda$  factor.  
2000 *Mathematics Subject Classification* 57R32, 46L87.