

**Stony Brook University
The Graduate School**

Doctoral Defense Announcement

Abstract

Self-Dual Metrics on 4-Manifolds

By

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In my thesis I have obtained the following results :

1. It is proven that the connected sum of two self-dual Riemannian 4-manifolds of positive scalar curvature is again self-dual with positive scalar curvature, under a hypothesis. This extends the celebrated result of Donaldson and Friedman.

2. We have applied the Geometric Invariant Theory(GIT) for Toric Varieties to the Einstein-Weyl Geometry and obtained a partial result. We have computed the image of the quotient of a C^* action on the twistor space of Honda metrics on the connected sum of three projective planes according to some linearization.

3. We give an example of a 4-manifold with $b_+ = 0$ admitting a scalar-flat anti-self-dual metric. It is a quotient of a K3 surface by a free $Z_2 + Z_2$ action. We showed that it does not admit any metric of positive scalar curvature. This shows that the scalar flat anti self-dual metrics (SF-ASD) on this manifold can not be obtained from a family of metrics for which the scalar curvature changes sign, contrary to the previously known constructions of this kind of metrics on manifolds of $b_+ = 0$.

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Time: 1:00 pm

Place: Math Tower 5-127

Program: PhD in Mathematics.

Dissertation Advisor: Claude LeBrun