HOLOMORPHIC YANG-MILLS FIELDS ON B-BRANES

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Considering B-branes over a complex manifold X as objects of the bounded derived category of coherent sheaves over X, we define holomorphic gauge fields on B-branes and introduce the Yang-Mills functional for these fields. These definitions extend well-known concepts in the context of vector bundles to the setting of B-branes.

For a given B-brane, we show that its Atiyah class is the obstruction to the existence of gauge fields. When X is the variety of complete flags in a three-dimensional complex vector space, we prove that any B-brane over X admits at most one holomorphic gauge field.

Furthermore, we establish that the set of Yang-Mills fields on a given B-brane, if nonempty, is in bijective correspondence with the points of an algebraic set defined by m complex polynomials of degree less than four in m indeterminates, where m is the dimension of the space of morphisms from the brane to its tensor product with the sheaf of holomorphic one-forms.

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