BOTT-CHERN FORMALITY AND MASSEY PRODUCTS ON SOLVMANIFOLDS

Compact Kähler manifolds and, more generally, compact complex manifolds satisfying the $\partial\overline{\partial}$-lemma are formal in the classical sense of Sullivan and of Dolbeault. However, for the notion of formality adapted to the Bott-Chern cohomology of a compact complex manifold, it has been shown that the (triple) Aeppli-Bott-Chern-Massey products (shortly, ABC-Massey products) do not obstruct the $\partial\overline{\partial}$-lemma. It is natural, then, to ask whether the existence of such products constitutes an obstruction for stronger properties, e.g., admitting a Kähler metric.

In this talk, I will present a positive answer for the class of Kähler solvmanifolds, by first showing a way of computing the cohomology of any Kähler solvmanifold and then, by proving that, on such a manifold, every ABC-Massey product vanishes. Moreover, I will provide an example of a compact complex non-Kähler manifold admitting a non vanishing quadruple ABC-Massey product, in the class of holomorphically parallelizable solvmanifolds. This is a joint work with Adriano Tomassini.