SEMINARIO DI GEOMETRIA

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Politecnico di Torino,
Dipartimento di Scienze Matematiche,
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Tate and Mumford–Tate conjectures for surfaces of general type with $p_g = q = 2$

In this talk we discuss the cohomology of smooth projective complex surfaces S of general type with invariants $p_g = q = 2$ and surjective Albanese morphism. We show that on a Hodge-theoretic level, the cohomology is described by the cohomology of the Albanese variety and a $K3$ surface X that we call the $K3$ partner of S. Furthermore, we show that in suitable cases we can geometrically construct the $K3$ partner X and an algebraic correspondence in $S \times X$ that relates the cohomology of S and X. Finally, we prove the Tate and Mumford–Tate conjectures for those surfaces S that lie in connected components of the Gieseker moduli space that contain a product-quotient surface.