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*Equivariant KAM*

Kolmogorov-Arnold-Moser (KAM) theory has a rich and well developed history. In this talk we present a KAM theory for  $\Gamma$ -equivariant Hamiltonian systems. Hamiltonian systems with discrete symmetry groups  $\Gamma$  arise naturally in many settings including for instances the  $N$ -body problem. If  $\Gamma$  is Abelian, then KAM theorem applies, but for  $\Gamma$  non-Abelian, 1:1 resonance effects lead to small divisor problems. These problems can be overcome by combining the isotypic decomposition of phase space with a detailed study of  $\Gamma$  and Torus invariants, all within the classical iterative proof structure. This is joint work with Dr. Luciano Buono.