

A Solution to the Zariski-Closure Conjecture for Exponential Lie Groups: A Longstanding Program with D. Manchon II

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In this talk, I will focus on the Zariski-Closure Conjecture for coadjoint orbits of exponential solvable Lie groups, a central open question in the orbit method and the deformation theory of unitary representations. This emphasizes the interplay between representation theory, quantization, and Poisson geometry. The aim is to introduce a new dequantization approach that links the theory of primitive ideals in the universal enveloping algebra to the algebraic geometry of coadjoint orbits, investigating the correspondence between generating families of primitive ideals and the ideals of polynomial functions vanishing on the Zariski closure of the associated orbits. This approach not only yields a complete proof of the Zariski-Closure Conjecture for exponential Lie groups but also allows us to characterize the family of quasi-Frobenius Lie algebras, providing a unifying framework that connects their algebraic and geometric properties.

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