

1137-16-14

Chelsea Walton, Xingting Wang* (xingting@temple.edu) and **Milen Yakimov**. *Irreducible representations of the 4-dimensional Sklyanin algebra at points of finite order.*

In 1982, Sklyanin constructed a certain noncommutative graded algebra $A(E, \tau)$ depending on an elliptic curve E embedded in \mathbb{P}^3 and a point $\tau \in E$ related to the Yang-Baxter equation in “quantum inverse scattering method”. It was shown by Smith and Stafford that these so-called 4-dimensional Sklyanin algebras have the same Hilbert series as the polynomial algebra on four variables and possess excellent homological property. When τ is torsion-free, Smith and Staniszkis proved that there are exactly 4-parametric families of non-trivial irreducible representations at each dimension of $k \geq 1$. In this talk, we give all irreducible representations of $A(E, \tau)$ when τ is of finite order $n > 4$ with the help of Poisson geometry and deformation quantization. By exploring a compatible Poisson structure on the central affine variety of $A(E, \tau)$ obtained by formal deformation, we are able to describe the Azumaya locus and prove that it coincides with the smooth locus of $A(E, \tau)$. We also relate these irreducible representations to the fat point modules of intermediate multiplicity classified by Smith. This is a joint work of Chelsea Walton and Milen Yakimov. (Received February 02, 2018)