

# Sklyanin Algebras and Hilbert Schemes of Points

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This lecture will describe recent joint work with Tom Nevins. We construct projective moduli spaces for torsionfree sheaves on noncommutative projective planes. These moduli spaces vary smoothly in the parameters describing the noncommutative plane, and have good properties analogous to those of moduli spaces of sheaves on the usual (commutative) projective plane  $\mathbf{P}^2$ . The generic noncommutative plane corresponds to the Sklyanin algebra  $S = S(E, \sigma)$  constructed from an automorphism  $\sigma$  of infinite order on an elliptic curve  $E \subset \mathbf{P}^2$ . In this case, the fine moduli space of line bundles on  $S$  with first Chern class zero and Euler characteristic  $1 - n$  provides a holomorphic symplectic variety that is a deformation of the Hilbert scheme of  $n$  points on  $\mathbf{P}^2 \setminus E$ .