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Schur Algebras in Type B

In type A, the q-Schur algebra of Dipper and James forms a graded cellular quasi-hereditary cover of the Hecke algebra as the commutant via Jimbo's quantum Schur–Weyl duality. In type B, however, the commutant $\mathcal{L}^n(m)$ and the quasi-hereditary cover $\mathcal{S}^n(\Lambda)$ (the cyclotomic q-Schur algebra of Dipper, James and Mathas) are non-isomorphic. At generic parameters they are both Morita equivalent to the type B Hecke algebra, but this fails at special parameters. By realizing $\mathcal{L}^n(m)$ as an idempotent truncation of $\mathcal{S}^n(\Lambda)$ we leverage the well-known structure of the cyclotomic q-Schur algebra to investigate the representation theory of $\mathcal{L}^n(m)$.