

Quantum Relativistic Toda Hamiltonians Associated With a Family of Cluster Algebras

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The quantum relativistic Toda Hamiltonians for classical root systems are obtained as the q -Whittaker limit of (dual) Macdonald operators or specialized Koornwinder operators. They are the conserved quantities of discrete evolutions in a family of quantum cluster algebras known as Q -systems. The polynomial eigenfunctions (q -Whittaker functions) can be constructed from the action of a subset of A -type cluster variables, which act as raising operators. This gives a uniform description for all classical root systems of such eigenfunctions. In some cases, the augmented cluster algebra quiver also gives a candidate for Baxter operators commuting with the quantum Hamiltonians.

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