RESEARCH PLANS

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My research goal is to generalize important results in the theory of quantum groups to the i-quantum groups setting based on an idea "The i-quantum groups are generalizations of the quantum groups. Generalize everything from quantum groups to i-quantum groups" (i-program), proposed by Bao-Wang. In particular, I aim to describe module structures over i-quantum groups combinatorially, and apply it to the representation theory of related algebras, and to integrable systems.

Based modules. I will analyze combinatorial structures obtained in the notion of based modules in representation theory of the i-quantum groups in a purely combinatorial way. Furthermore, by reinterpreting results to be obtained there in terms of representation theory of the i-quantum group, I will make both sides ample. From partial results obtained this far, it is expected that such a combinatorial theory provides more natural construction of Bao-Wang's i-canonical bases.

Applications to the quantum Brauer algebra and the Hecke algebra of type B. It is known that the i-quantum groups of type AI and AIII are closely related to the quantum Brauer algebra and the Hecke algebra of type B, respectively (Schur duality). Using this fact and the theory of based modules in representation theory of i-quantum groups, I will study the cellular structures of the quantum Brauer algebra and the Hecke algebra of type B. This is also important for applications to modular representation theory of these algebras.

Extension of the theory of i-crystals. I aim to extend the theory of i-crystals to more general i-quantum groups. It is expected that the finite-dimensional representations of the i-quantum group of type AII can be described in terms of symplectic tableaux, a kind of Young tableaux. I seek how to describe the theory of i-crystals in this case as a first step.

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