Quantum structures for Lagrangian submanifolds

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Abstract

There are two fundamental versions of Floer homology in symplectic topology. The first is Floer homology for periodic orbits of Hamiltonian systems, which can be identified with quantum homology. The second is Floer homology for Lagrangian submanifolds. In this talk we shall explore algebraic and geometric relations between these two theories. In particular we shall show that Lagrangian Floer homology is a (non-commutative) algebra over the quantum homology of the ambient manifold. We shall also define several other canonical relations between these two objects such as a quantum inclusion map as well as canonical augmentation and duality. Finally we shall present several applications of our approach to the topology of Lagrangian submanifolds, to symplectic packing and to enumeration problems of holomorphic disks.