An affine quantum cohomology ring for flag manifolds and the periodic
Toda lattice

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Abstract: I will talk about the quantum cohomology ring of full affine Kac-Moody flag manifolds, which are the affine analogues of regular coadjoint orbits of compact Lie groups. Such rings have been investigated in papers by Guest and Otofuji (2001) and by myself (2004). However, the rigorous foundations are still to be established. The main focus of the talk will be on results that Leonardo Mihalcea and myself have obtained recently in this context. First, we proved a quantum Chevalley formula, which describes the quantum multiplication by degree-two classes. Even though these classes do not generate the entire cohomology ring, our formula can be used to define a new (associative) ring, whose ideal of relations is determined by the integrals of motion of a certain integrable system of Toda lattice type.