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Double Bruhat Cells in Kac-Moody Groups and Integrable Systems

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We construct a family of integrable Hamiltonian systems parametrized by pairs of Coxeter elements in the affine Weyl group. Their phase spaces are double Bruhat cells in the corresponding Kac-Moody groups, and their Hamiltonians are characters of evaluation representations. We derive the relativistic periodic Toda lattice as a special case. In the process we extend several known results on double Bruhat cells in semisimple Lie groups to arbitrary symmetrizable Kac-Moody groups, and study the Poisson-Lie theory of ind-algebraic groups.

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