

Meeting: 1001, Evanston, Illinois, SS 17A, Special Session on Geometric Aspects of the Langlands Program

1001-14-76 **Michael Finkelberg*** (finklberg@mccme.ru), Independent Moscow University, Bolshoj Vlasjevskij Pereulok, dom 11, 119002 Moscow, Russia. *Uhlenbeck spaces for \mathbb{A}^2 and affine Lie algebras.*

This is a report on a joint work with A. Braverman and D. Gaitsgory. For a simply connected almost simple complex Lie group G , let Bun^a be the moduli space of principal G -bundles on the projective plane \mathbb{P}^2 , of second Chern class a , trivialized along a line $\mathbb{P}_\infty^1 \subset \mathbb{P}^2$. This space is isomorphic to the space of G -instantons on \mathbb{R}^4 , and is noncompact but possesses a certain (partial) topological completion discovered by K. Uhlenbeck. Our goal is to construct this Uhlenbeck completion Uhl_G^a in the algebraic geometric setting. The construction proceeds in terms of the corresponding affine Lie algebra $\hat{\mathfrak{g}}$ and its affine Grassmannian. The space Uhl_G^a turns out to have singularities at the boundary; the Poincare polynomials of the Goresky-MacPherson sheaves' stalks are governed by the combinatorics of the Langlands dual affine Lie algebra $\hat{\mathfrak{g}}^L$. (Received August 09, 2004)