THE FACTORIZABLE FEIGIN-FRENKEL CENTER

Abstract

Consider $\mathfrak{g}$, a simple finite Lie algebra over $\mathbb{C}$, let $\check{\mathfrak{g}}$ be its Langlands dual Lie algebra and $\hat{\mathfrak{g}}_{\kappa_c}$ the affine algebra at the critical level. It is a Theorem of the nineties, by Feigin and Frenkel, that the center of the completed enveloping algebra of $\hat{\mathfrak{g}}_{\kappa_c}$ is canonically isomorphic to the algebra of functions on $\mathrm{Op}_{\check{\mathfrak{g}}}(D^*)$, the space of $\check{\mathfrak{g}}$-Opers on the pointed disk D^*. These objects are actually pointwise instances of a more general picture: the space $\mathrm{Op}_{\check{\mathfrak{g}}}(D^*)$ identifies with the fibers of a canonically defined space $\mathrm{Op}_{\check{\mathfrak{g}}}(D^*)_C$ over any smooth curve C , which has a natural **factorization structure**. The same kind of upgrade may be performed at the level of the affine algebra $\hat{\mathfrak{g}}_{\kappa_c}$: it is possible to define a natural enhancement of the center of its completed enveloping algebra which is indeed a factorization algebra. These factorization structures are fundamental for the Geometric Langlands community: factorization patterns allows for local to global arguments.

The goal of this talk will be to better explain the construction of the objects mentioned above and elaborate on a joint work with Andrea Maffei in which we prove the factorizable version of the Feigin-Frenkel theorem.