ON DRINFELD OLDFORMS AND NEWFORMS

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ABSTRACT. The theory of oldforms and newforms is a well-understood area in the theory of classical modular forms. Certain properties of modular forms heavily depend on whether they belong to oldforms or newforms. For example, the space of newforms has a basis consisting of normalized eigenforms for all the Hecke operators. In fact, the Fourier coefficients of these normalized eigenforms generate a number field. However, the analogues theory of oldforms and newforms is not known for Drinfeld modular forms.

Recently, in a series of articles, Bandini and Valentino defined the notion of $\mathfrak{p}$-oldforms and $\mathfrak{p}$-newforms for Drinfeld modular forms. Moreover, they conjectured that the space of cusp for level T can be written as a direct sum decomposition of T-oldforms and T-newforms.

In this talk, we shall prove that, under certain assumptions, this conjecture is true. Moreover, we shall state a variant of this conjecture for higher level and provide many examples where this conjecture is true. However, for Drinfeld cusp forms of composite level, we shall prove that this conjecture may fail by providing examples of such spaces. Finally, we define the notion of Oldforms and Newforms for Drinfeld modular form of square free level. This is a joint work with Narasimha Kumar.

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