

Blow-ups and Vertex Operator Algebras

Masayuki Fukuda¹

¹ Department of Physics, Faculty of Science,
University of Tokyo, Hongo, Tokyo 113-0033, Japan

We explicitly identify the vertex operator algebra associated by Gaiotto-Rapčák and Procházka-Rapčák (2017) to $SU(N)$ gauge theory on a one-point blow-up of \mathbb{C}^2 as the product of the W_N algebra and the affine $\mathfrak{sl}(N)$ algebra at level 1. We give a proof of this relation, which should underlie the blow-up equation of Nakajima-Yoshioka, using a recent result of Arakawa-Creutzig-Linshaw (2018) which gave a mathematical proof of the long-conjectured construction of W-algebras in terms of a coset of affine Lie algebras. Our proof generalizes a result of Bershtein-Feigin-Litvinov (2013) for the $N = 2$ case.