1145-68-382          **Jiahan Du\*** (`dujiahan@berkeley.edu`), 2318 Eighth Street, Berkeley, CA 94710. *On the rank of matrix multiplication tensors of medium size.* Preliminary report.

The multiplicative complexity of matrix multiplication for n by n matrices is an important topic in theoretical computer science, and in this paper I will use techniques developed by Alexander Sedoglavic in 2017 to produce new upper bounds for matrix multiplications of medium rank. I will begin by giving key definitions of algebraic complexity and tensor rank. Then I will revisit historical results obtained for upper bound and lower bound of the matrix multiplicative complexity from such authors as Winograd, Strassen, and Landsberg. Next, I'll explain the basic method developed by Sedglovic and how it can be useful in decomposing multiplication tensors and how it can be further improved on to have less loss of efficiency. Finally, I will give a comparison of all known lower and upper bounds with a summary of methods that have the potential to generate new asymptotically faster algorithms. (Received September 04, 2018)