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**Ke Ye\*** ([kye@galton.uchicago.edu](mailto:kye@galton.uchicago.edu)) and **Lek Heng Lim**. *Tensor network states and G-ranks*. Preliminary report.

Tensor network states (TNS) are tensors associated to graphs. TNS are used to study quantum systems in condensed matter physics. In this talk, we will first define tensor network states and give some examples, including tensor trains (TT) and matrix product states (MPS). Then we will discuss the dimension of the set of tensor network states associated to a graph. Finally, for any graph  $G$ , we will define the notion of  $G$ -rank which generalizes the rank of matrices and we will show that the  $G$ -rank is unique if and only if  $G$  is a tree. If time permits, we will also discuss some properties of  $G$ -ranks. This talk is based on a joint work with Lek-Heng Lim. (Received September 09, 2016)