Title: On spectrum of sample covariance matrices from large tensor vectors

Abstract: In this talk, we study the limiting spectral distribution of sums of independent rank-one large k-fold tensor products of large n-dimensional vectors. In the literature, the limiting moment sequence is obtained for the case $k=o(n)$ and $k=O(n)$. Under appropriate moment conditions on base vectors, it has been showed that the eigenvalue empirical distribution converges to the celebrated Mar\v{c}enko-Pastur law if $k=O(n)$ and the components of base vectors have unit modulus, or $k=o(n)$. In this talk, we study the limiting spectral distribution by allowing k to grow much faster, whenever the components of base vectors are complex random variables on the unit circle. It turns out that the limiting spectral distribution is Mar\v{c}enko-Pastur law. Comparing with the existing results, our limiting setting only requires $k \to \infty$. Our approach is based on the moment method.