Many-body delocalization with random vector potentials$^1$ CHEN CHENG, RUBEM MONDAINI, Beijing Computational Science Research Center — In this talk we present the ergodic properties of excited states in a model of interacting fermions in quasi-one dimensional chains subjected to a random vector potential. In the non-interacting limit, we show that arbitrarily small values of this complex off-diagonal disorder triggers localization for the whole spectrum; the divergence of the localization length in the single particle basis is characterized by a critical exponent $\nu$ which depends on the energy density being investigated. However, when short-ranged interactions are included, the localization is lost and the system is ergodic regardless of the magnitude of disorder in finite chains. Our numerical results suggest a delocalization scheme for arbitrary small values of interactions. This finding indicates that the standard scenario of the many-body localization cannot be obtained in a model with random gauge fields.


$^1$This research is financially supported by the National Natural Science Foundation of China (NSFC) (Grant Nos. U1530401 and 11674021). RM also acknowledges support from NSFC (Grant No. 11650110441).