

Motivation and contributions

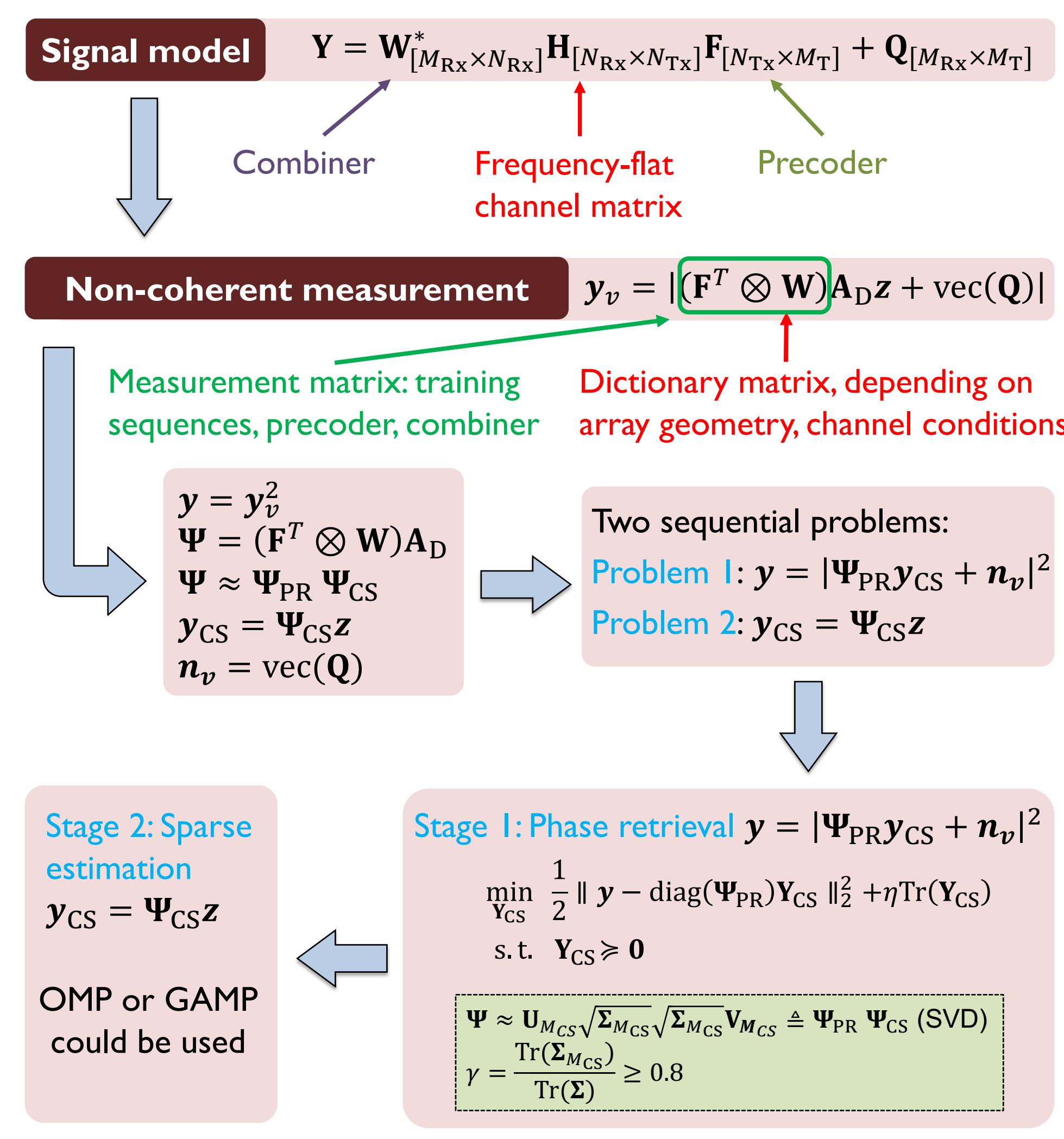
Motivation:

- The measurements collected by the practical off-the-shelf mmWave devices are non-coherent.
- Real implementation of advanced mmWave algorithms by using practical low-cost devices with imperfection.

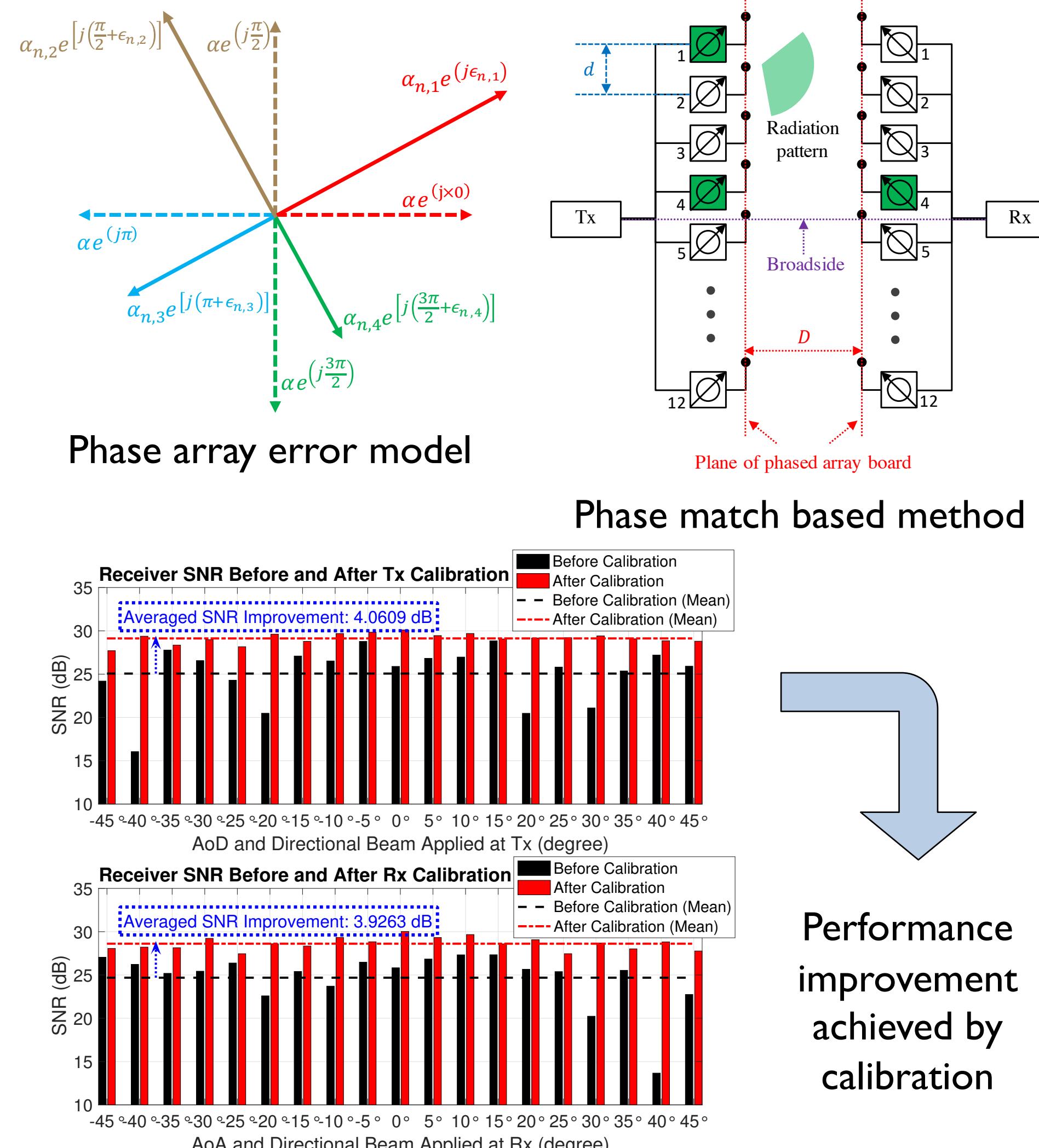
Contributions:

- A two-stage compressive phase retrieval (CPR) algorithm for non-coherent mmWave beam alignment.
- A fully reconfigurable 60 GHz mmWave test bed with a MATLAB-based SDR platform.
- A phase match based phased array calibration process

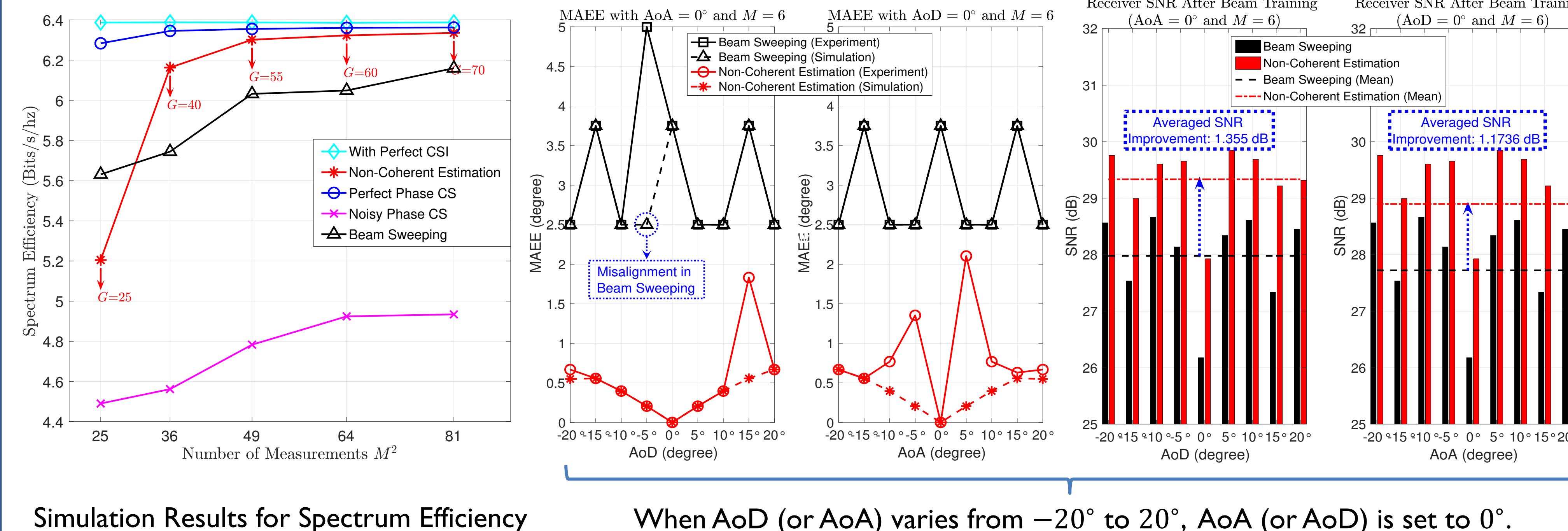
Non-coherent channel estimation



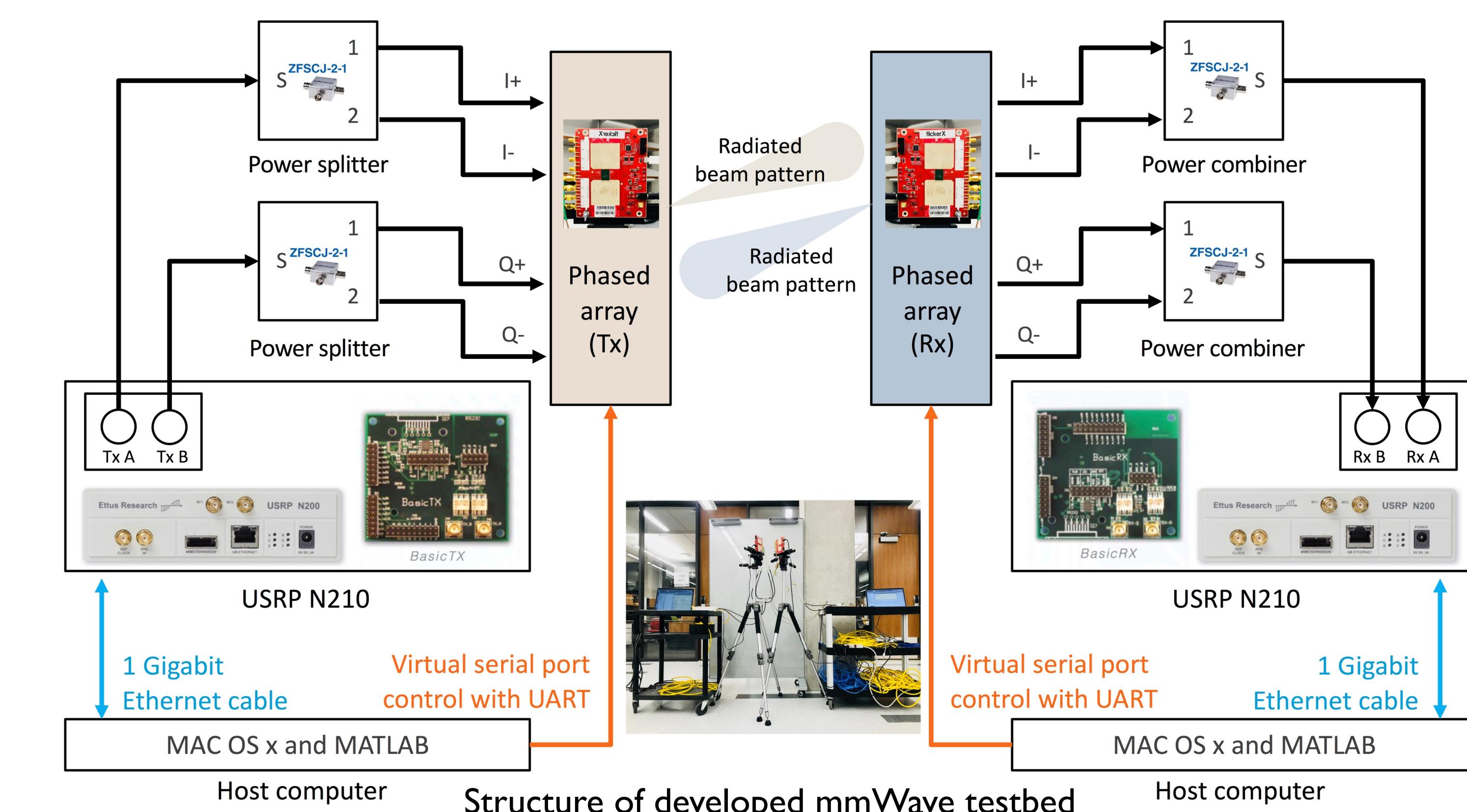
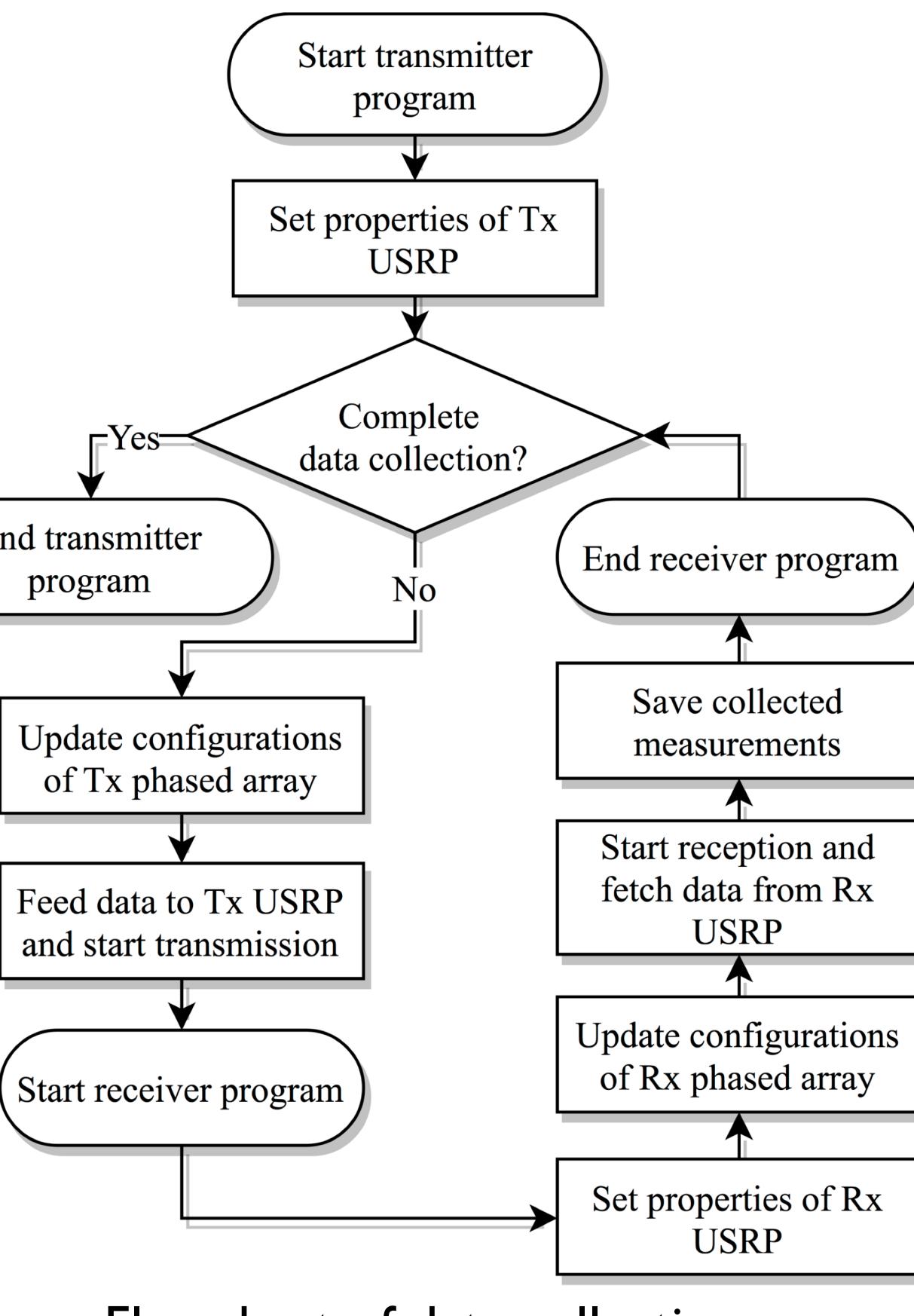
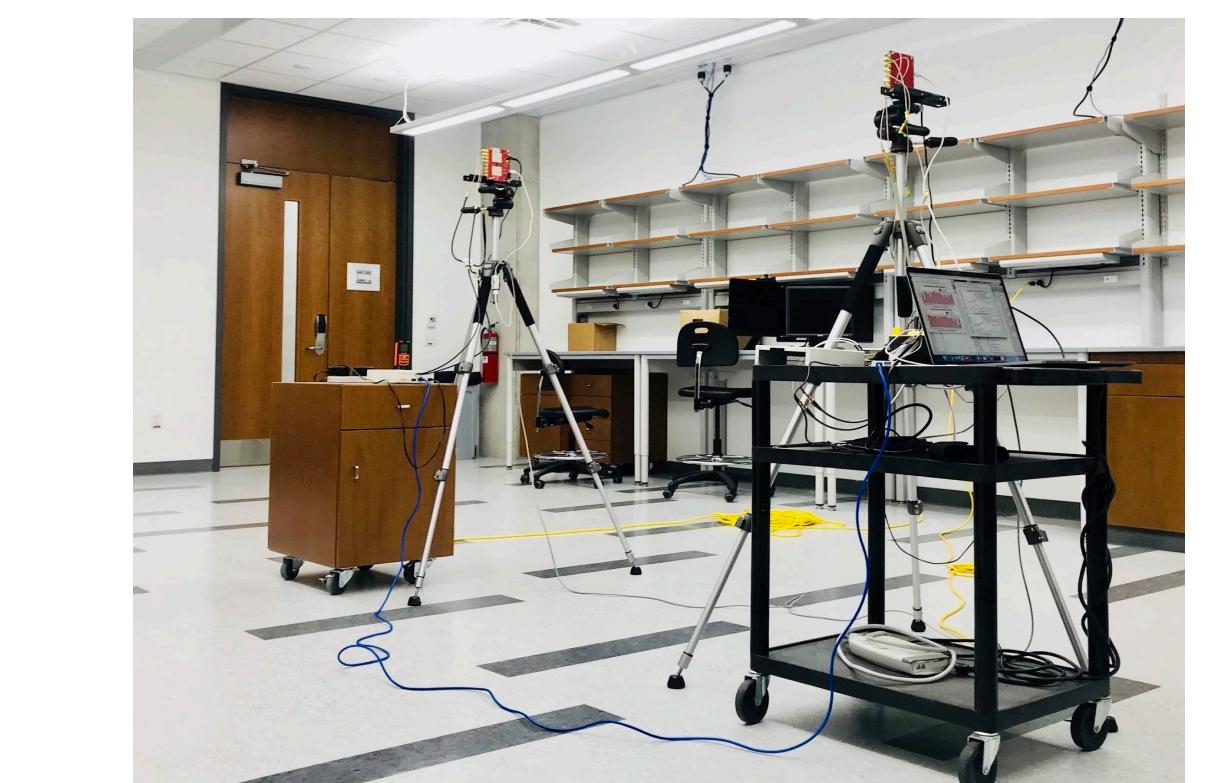
Phased array calibration



Numerical and experimental validation



Fully reconfigurable 60 GHz mmWave testbed



Reference

- [1]. M. E. Rasekh, Z. Marzi, Y. Zhu, U. Madhow, and H. Zheng, "Noncoherent mmWave path tracking," in Proc. the 18th ACM Int. Workshop Mobile Comput. Syst. and Appls. (HotMobile '17), Sonoma, CA, USA, 2017, pp. 13-18.
- [2]. M. Iwen, A. Viswanathan, Y. Wang, "Robust sparse phase retrieval made easy," *Applied and Computational Harmonic Analysis*, vol. 42, no. 1, pp. 135-142, Jan., 2017.
- [3]. S. Bahmani, J. K. Romberg, "Efficient compressive phase retrieval with constrained sensing vectors," in Proc. Advances in Neural Information Processing Systems (NIPS), Montreal, Canada, 2015, pp. 523-531.
- [4]. R. W. Heath, N. Gonzalez-Prelicic, S. Rangan, W. Roh, and A. M. Sayeed, "An overview of signal processing techniques for millimeter wave MIMO systems," *IEEE J. Sel. Topics Signal Process.*, vol. 10, no. 3, pp. 436-453, Apr. 2016.