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Efficient Characterization
of High-Dimensional Classical and Quantum Problems

During the past years, progress in controlling many-body quantum systems has led to the emergence of a new bottle neck: The number of parameters required to fully characterize a system has reached a regime where naive methods are no longer applicable. This is problematic in the emergent field of quantum technologies, where the verification and characterization of components is an important objective. The development is in no way unique to quantum physics. Indeed, classically, the theory of ill-defined high-dimensional estimation problems has become a successful focus of mathematical data science. I'll report in particular on work we have done in the context of "compressed sensing", which bridges the classical and the quantum theories.