**Academy of Mathematics and Systems Science, CAS**
**Colloquia & Seminars**

**Speaker:** 苗子博 博士,哈尔滨工业大学 (深圳)

**Inviter:**

**Title:** Synthesis of robust memory modes for linear quantum systems with unknown inputs

**Language:** Chinese

**Time & Venue:** 2023.08.22 14:00-15:00

**Abstract:**

In this work, synthesis of robust memory modes for linear quantum passive systems in the presence of unknown inputs has been studied, aimed at facilitating secure storage and communication of quantum information. In particular, we can switch on decoherence-free (DF) modes in the storage stage by placing the poles on the imaginary axis via a coherent feedback design scheme, and these modes can further be simultaneously made robust against perturbations to the system parameters by minimizing the condition number associated with imaginary poles. The DF modes can also be switched off by tuning the controller parameters to place the poles in the left half of the complex plane in the writing/reading stage. We develop explicit algebraic conditions for the existence of such a coherent quantum controller, which involves employing an augmented system model to counter the influence of unknown inputs. Examples are provided to illustrate the procedure of synthesizing robust DF modes for linear optical quantum systems.