**Matthew James**

**Australian National University, Australia**

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Room 311, Lanbai Building, Academy of Math. & Sys. Sci., CAS

**Title：** Quantum Filtering for Systems Driven by Fields in Non-Classical States

## Biography

**Matthew R. James**' research interests include quantum feedback control, nonlinear robust control, and stochastic control. He received the B.Sc. degree in mathematics and the B.E. (Hon. I) in electrical engineering from the University of New South Wales, Sydney, Australia, in 1981 and 1983, respectively. He received the Ph.D. degree in applied mathematics from the University of Maryland, College Park, USA, in 1988. In 1988/1989 he was Visiting Assistant Professor with the Division of Applied Mathematics, Brown University, Providence, USA, and from 1989 to 1991 he was Assistant Professor with the Department of Mathematics, University of Kentucky, Lexington, USA. In 1991 he joined the Australian National University, Australia, where he served as Head of the Department of Engineering during 2001 and 2002. He has held visiting positions with the University of California, San Diego, Imperial College, London, and University of Cambridge. James is a co-recipient (with L. Bouten and R. Van Handel) of the SIAM Journal on Control and Optimization Best Paper Prize for 2007. He is currently serving as Associate Editor for IEEE Transactions on Automatic Control, and has previously served SIAM Journal on Control and Optimization, Automatica, and Mathematics of Control, Signals, and Systems. He is a Fellow of the IEEE, and he held an Australian Research Council Professorial Fellowship during 2004-2008.

## Abstract

This talk will explain how quantum filtering can be extended to cover important cases where the driving field is in a highly non-classical state. Specifically, we consider fields that are in (i) single photon states, or (ii) a superposition of coherent states. Such states of light are important for several reasons, including their application in emerging quantum technologies, as well as for fundamental reasons. In the talk, I will review some of the basic ideas concerning quantum filtering for vacuum (or coherent) field states, and then describe two general methodologies for finding quantum filters for the two types of non-classical states.