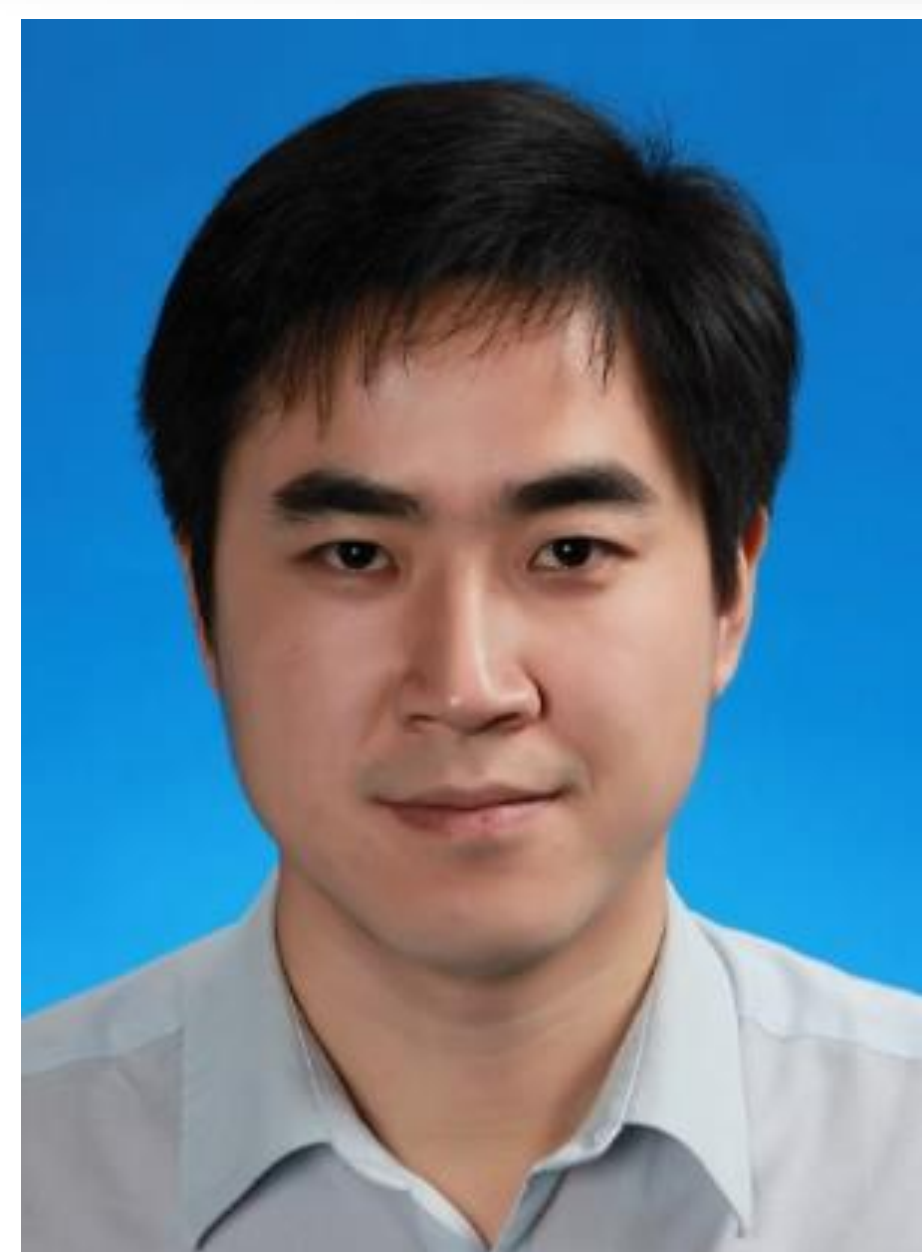




# 學術報告

## Exponential Quantum Projection Filtering



报告人: Dr. Qing Gao

University of Duisburg-Essen, Germany

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地点: 浙江大学工控新楼501室

**Biography:** Qing Gao received the B. Eng. and Ph.D. degrees from the University of Science and Technology of China. He received the Ph.D. degree in Mechatronics Engineering from the City University of Hong Kong. He was with the University of New South Wales, as a postdoctoral research associate. Currently he is with the University of Duisburg-Essen, Germany, as an Alexander von Humboldt Research Fellow. His research interests include intelligent systems & control, and quantum control. Dr. Gao received the Outstanding Research Thesis Award from City University of Hong Kong, and the Outstanding Doctoral Dissertation Award from the Chinese Academy of Sciences. He is the recipient of the 21st Guan Zhao-zhi Award.

An approximate exponential quantum projection filtering scheme is developed for a class of open quantum systems. By using a differential geometric approach, the quantum trajectory is constrained in a finite-dimensional differentiable manifold consisting of an unnormalized exponential family of quantum density operators, and an exponential quantum projection filter is formulated as a number of stochastic differential equations satisfied by the finite-dimensional coordinate system of this manifold. A convenient design of the differentiable manifold is presented through reduction of the local approximation errors, which yields a simplification of the quantum projection filter equations. It is shown that the computational cost can be significantly reduced by using the quantum projection filter. It is also shown that the input-to-state stability can be established.