



**The Hong Kong University of Science and Technology**

**Department of Mathematics**

**PhD THESIS EXAMINATION**

**Structures of Higher Genus Quantum Singularity Theory  
via Mixed Spin P-Field Theory**

*By*

**Mr. Huaigong ZHANG**

**ABSTRACT**

We prove a Feynman rule structure for higher genus Fan-Jarvis-Ruan-Witten (FJRW) theory. It reduces the infinity unknown FJRW invariants at each genus to finite unknown ambiguities. As a corollary, we get a polynomial structure of higher genus FJRW potential. The method is to construct a GIT master space of the target, and use torus localization on the master space to get relations among higher genus invariants.

**Date : 9 Jul 2025, Wednesday**

**Time : 3:30 pm**

**Venue : Room 2504 (Lifts 25/26)**

**Thesis Examination Committee:**

<b>Chairman</b>	<b>:</b>	<b>Prof. Hongbin LIU, OCES/HKUST</b>
<b>Thesis Supervisor</b>	<b>:</b>	<b>Prof. Huai-Liang CHANG, MATH/HKUST</b> <i>(via online mode)</i>
<b>Thesis Supervisor</b>	<b>:</b>	<b>Prof. Shuai GUO, MATH/Peking University</b>
<b>Member</b>	<b>:</b>	<b>Prof. Weiping LI, MATH/HKUST</b> <i>(via online mode)</i>
<b>Member</b>	<b>:</b>	<b>Prof. Guowu MENG, MATH/HKUST</b> <i>(via online mode)</i>
<b>Member</b>	<b>:</b>	<b>Prof. Ding PAN, PHYS/HKUST</b>
<b>External Examiner</b>	<b>:</b>	<b>Prof. Zhengyu ZONG, Department of Mathematical Sciences/ Tsinghua University</b> <i>(via online mode)</i>

*(Open to all faculty and students)*

The student's thesis is now being displayed on the reception counter in the General Administration Office (Room 3461).