



The Hong Kong University of Science and Technology

Department of Mathematics

PhD THESIS EXAMINATION

1D Generalized Kepler Problems

By

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ABSTRACT

The 1D generalized Kepler problems completely classify the integrable systems with conformal algebra $\mathfrak{so}(1,2) \simeq \mathfrak{sl}(2, \mathbb{R})$. We construct the symplectic embeddings of the energy-definite portions of phase space $\iota_- : \Sigma_- \rightarrow \mathcal{O}_-\mu$ and $\iota_+ : \Sigma_+ \rightarrow \mathcal{O}_-\{\mu/2\}$, where the images are dense open subsets of coadjoint orbits of $\mathfrak{sl}(2, \mathbb{R})$. They are S-duality maps that reveal hidden symmetry. Then, we quantize the phase spaces, identifying them with the holomorphic discrete series representations of the universal cover $\tilde{SL}(2, \mathbb{R})$, with $\hat{\iota}_- : \hat{\Sigma}_- \rightarrow \mathcal{D}_-^+ \kappa$ and $\hat{\iota}_+ : \hat{\Sigma}_+ \rightarrow \mathcal{D}_-^+ \{(\kappa+1)/2\}$ being the quantum version of the S-duality maps.

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Time : 2:00 pm

Venue : Rm 5508 (Lifts 25/26), 5/F Academic Building, HKUST

Thesis Examination Committee:

Chairman	:	Prof. Xiaofang ZHOU, CSE/HKUST
Thesis Supervisor	:	Prof. Guowu MENG, MATH/HKUST (via online mode)
Member	:	Prof. Min YAN, MATH/HKUST
Member	:	Prof. Tsz Kiu Aaron CHOW, MATH/HKUST
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(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).