

Speaker: Haru Negami (JAMSTEC)

Title: From Hypergeometric Functions to Quantum Computing

Abstract: Hypergeometric functions arise as solutions of a classical family of differential equations whose monodromy has played a fundamental role in the interaction between analysis, geometry, and representation theory. Their higher-dimensional analogues naturally lead to KZ-type differential equations and representations of pure braid groups.

In this talk, I will explain how integral transformations of KZ-type equations can be used to construct new representations of pure braid groups from given ones. I will then describe how this construction extends to braid groups and provides a systematic method for producing unitary braid group representations. Finally, I will discuss how these representations can be applied to quantum computation, where unitary representations of braid groups provide a natural framework for realizing quantum operations.

The aim of the talk is to present a direct path from classical hypergeometric functions and differential equations to braid group representations and their applications in quantum computing.