RIBF ULIC Symposium/Mini-WS Report

Report date	**June 18, 2025**

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Workshop reference number	**RIBF-ULIC Mini-WS043**
Title	**量子もつれと原子核物理**
Date	**5–6 June 2025**
Venue	**Nishina RIBF Building**
Language	**Japanese**
Workshop website	**https://indico2.riken.jp/event/5169/**
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Summary of discussions and its (expected) results

The workshop explored the conceptual and practical roles of quantum entanglement in nuclear physics, focusing on systems of identical particles. Participants discussed whether entanglement measures like the von Neumann entropy, widely used in quantum information theory, are meaningful in nuclear systems with limited operational access. Entanglement entropy was highlighted as a promising tool to quantify clustering and correlations in two- and multinucleon systems.

Emerging ideas included using entanglement as an indicator in compound nucleus formation and fission processes, and connecting it with information-theoretic resource frameworks. Recent theoretical developments using time-dependent Hartree–Fock and shell-model simulations were reviewed, showing potential links between entanglement and observable phenomena such as nucleon transfer fluctuations.

Concepts like resource theory and mereology were introduced to bridge quantum information with nuclear structure. While a unified framework remains elusive, the workshop clarified current challenges and opportunities, suggesting future directions for theory and experiment driven by entanglement-inspired perspectives.