RCNP, OSAKA UNIVERSITY
NUCLEAR PHYSICS
THEORY SEMINAR

Title	**LINKING NUCLEAR REACTIONS AND NUCLEAR STRUCTURE TO STUDY EXOTIC NUCLEI**
Speaker	Prof. Willem H. Dickhoff
Date and Time	MAY 30th (Wed) in 2018 13:30
Place	Lecture room 1 on the 6th floor of RCNP main building

Abstract:

Probing the properties of nucleons in exotic nuclei mostly requires dealing with strongly interaction probes as for example in transfer or knock-out reactions. Our group has revisited the analysis of the (e, $e'p$) reaction to confirm whether the distorted-wave impulse approximation (DWIA) provides the correct reaction model when consistent overlap functions and distorted waves are employed. These ingredients are provided by the dispersive optical model (DOM), originally conceived by Claude Mahaux[1], as it provides a unified description of both elastic nucleon scattering and structure information related to single-particle properties below the Fermi energy[2]. Recent extensions of this framework have been introduced that include a fully nonlocal implementation for ^{40}Ca[3,4]. For the first time properties below the Fermi energy like the charge density and the presence of high-momentum nucleons can be included in the DOM description while elastic cross section data can be represented as accurately as in the local DOM implementation. Application of the nonlocal DOM to ^{48}Ca incorporates the effect of the 8 additional neutrons and allows for an excellent description of elastic scattering data of both protons and neutrons[5]. The corresponding neutron distribution constrained by all available data generates a prediction for the neutron skin of 0.249 $\pm$ 0.023 fm for this nucleus[5] which is larger than most mean-field and available *ab initio* results.

We report on the most recent developments including a nonlocal DOM analysis for ^{208}Pb, an extension to heavier Ca isotopes, an analysis of the energy density in comparison with *ab initio* nuclear matter calculations, applications to transfer reactions with DOM ingredients, possible extensions to (p, pN) reactions and the aforementioned reanalysis of (e, $e'p$) data to determine if experimental data can constrain the magnitude of *absolute* spectroscopic factors.

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