博士論文公聴会の公示（物理学専攻）

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論文題目：Study of nucleon density distributions of nuclei and energy dependence of the charge changing cross sections via Glauber model
（グラウバー模型による荷電変化断面積エネルギー依存性と核内核子密度分布の研究）

日時 ：2017年　2月　6日　（月）　13:00－14:30

場所 ： 理学研究科H棟7階7階セミナー室（H701号室）

主査 ：青井　考

副査 ：下田　正、福田　光順、緒方　一介、延與　佳子

論文要旨：

　　The radii of point proton and neutron distribution in a nucleus (referred to as "proton radius" and "neutron radius" hereafter) are important nuclear observables. Whereas the proton radii of stable and unstable nuclei have been determined directly and extensively using the electron-scattering and isotope-shift methods, respectively, the neutron radii have been mostly extracted via the Glauber model, combining the measured proton radii and the interaction or reaction cross sections. The electron scattering or isotope-shift methods, however, cannot be applied to unstable nuclei with atomic number $4 < Z < 11$. In this work, we measured the charge-changing cross sections (σ_{CC}) of $^{12-18}$C on a ^{12}C target at energies around $50A$ MeV to determine their proton radii. To analyze these low-energy data, we devised a global parameter set to extend the Glauber model to a wide range of energy. The model was applied to calculate the reaction cross sections for ^{12}C on ^{9}Be and ^{27}Al targets, and the results show excellent agreement with the experiment data in wide energy range. Applying this Glauber model to our measured σ_{CC}'s, the proton radii for $^{12-18}$C have been extracted. The consistency of the obtained results with the electron-scattering and high-energy measurements demonstrates the feasibility to determine the proton radii of nuclei from σ_{CC} measurement at low energy.