



# 564<sup>th</sup> ASRC Seminar



Date: 13:30 ~ , 18 September

Location: Meeting room 302, ASRC Building


Speaker: Prof. Atsushi Nakamura

(Hiroshima University,

Graduate School of Integrated Arts and Sciences)

Title: Exploring QCD Phase Diagram through  
Baryon-Multiplicity at Heavy Ion Collisions

To study high density state at laboratories, nuclear beam and/or target experiments have pursued. The beam-energy scan (BES) >> experiment at RHIC is expected to bring us important information. In analyzing such experiment, the state is described by the temperature and chemical potential, in other words, we describe a system in the grand canonical partition functions. In the statistical mechanics, we learn that this grand canonical partition function approach is equivalent to the canonical partition function description, where the temperature and the baryon number are physical parameters. Two formulations are theoretically equivalent. The experimental observable, the net-baryon multiplicity is directly related to the canonical partition functions. Using the equivalence, we convert the information to the standard description, i.e., the chemical potential and the temperature. Using currently available RHIC data, I will show that the multiplicity tells us a lot about the QCD phase diagram, and we can go to the QCD phase boundary when we have higher multiplicities, for which we need very high intensity such as J-PARC.



なお、今回のセミナーは、第34回「原子核ハドロン物理セミナー」を兼ねております。

セミナー内容は [http://silver.j-parc.jp/hadron/hadron\\_seminar/index.html](http://silver.j-parc.jp/hadron/hadron_seminar/index.html) でご覧になれます。

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