1P284 熱泳動現象を用いた鎖状高分子の凝集における分子構造転移の影響**Effects of polymer chain folding for polymer aggregation in thermophoresis****Kenta Odagiri** (*MIMS, Meiji Univ.*)

We theoretically investigate aggregation of flexible polymer chains caused by competition between thermophoresis and entropic effect, inspired by the recent experiments on finding the polymer structure dependence of DNA accumulation in a PEG solution under temperature gradient. The experiment showed that the coil-globule transition for DNA is observed for a large PEG volume fraction and the transition causes the wide range of ring-like localization. To explain the experimental results, we construct a new model which takes into account effects of the polymer structural transition caused by PEG volume fraction explicitly. The phase transition for the PEG distribution and the change of the size of ring-like distribution for long polymer will be discussed.

**1P287 精円率変化検出CD測定法の発展とその生物系への応用
Development of elliptically-polarization-detected CD apparatus and its application to the biological systems****Yasuyuki Araki**, Yoshiyuki Hamada, Makoto Murakami, Seiji Sakamoto, Takehiko Wada (*IMRAM, Tohoku Univ.*)

Circular Dichroism (CD) spectral study is one of the most powerful and versatile methods for detection of interaction and binding of biomolecules. Though, it is hard to measure CD spectra with good to excellent S/N, as a result of small differences in extinction coefficients of asymmetric left and right circularly polarized light. In order to improve the sensitivity disadvantage, a new control method of ellipticity of pseudo-linearly elliptically polarized light by the azimuth of retarder to get high sensitivity in CD detection has been proposed in this work. We have also confirmed that this technique has been suitable for the time-resolved CD spectroscopy. Some results of time-resolved CD study of the biological systems have also been demonstrated in this poster.

**1P285 ベイズ統計を用いた超解像CTアルゴリズム
Super resolution computed tomography based on Bayesian statistics****Jun Kozuka**¹, Takaki Makino², Haruo Mizutani² (¹*QBiC, RIKEN*, ²*Grad. Sch. Fro. Sci., Univ. Tokyo*)

The reconstruction of a high-quality three-dimensional image from a low-resolution sinogram, which is a visual representation of the two-dimensional projection data obtained from computed axial tomography, is an important problem which arises in fields such as microscope and medical imaging. It is known that several artifacts originated from the inverse Radon transformation arise during typical reconstruction approaches. We have developed a Bayesian treatment of the super-resolution computed tomography problem. This approach is rendered tractable through the introduction of Gaussian processes. Results indicate a significant improvement over techniques based on the filtered back projection.

**1P288 物質の非平衡加熱状態観測のための In-situ マイクロ波照射 NMR 分光法の開発
Development of in-situ microwave irradiation NMR spectroscopy for observing non-equilibrium heating state of substances****Yugo Tasei**¹, Teruaki Fujito², Izuru Kawamura¹, Akira Naito¹ (¹*Graduate of Engineering, Yokohama National University*, ²*Probe Laboratory Inc.*)

Microwave(MW) is widely used in the acceleration of organic reaction. However, detailed molecular mechanism of MW heating effect on the chemical reaction has not well understood yet. We investigated the MW heating effect by using newly developed *in-situ* microwave irradiation NMR spectroscopy. ¹H NMR spectra of liquid crystalline samples were observed under MW irradiation. The results indicate significant change of the chemical shifts. Surprisingly, the chemical shift value of isotropic phase under MW irradiation was corresponding to 200 degree higher than that of thermally equilibrated isotropic phase. *In-situ* microwave irradiation NMR spectroscopy can be applicable to analyze MW heating effects in biological systems under MW irradiation.

1P286 フリーズフラクチャー原子間力顕微鏡によるバクテリオロドプシンの3次元結晶の観察**Observation of the crystal structure of bacteriorhodopsin by freeze fracture atomic force microscopy****Naoto Kuga**, toshiaki Gotou, Tutomu Kouyama (*Nagoya Univ.*)

Atomic force microscopy (AFM) has been established as an important tool to analyze the surface topology of a biological sample at nanometer resolution. For observation of intracellular structures by electron micrography, the freeze-fracture method has been utilized. In this study, we have improved a cryogenic AFM and freeze fracture apparatus to obtain topological images of a fractured surface of a frozen crystal of bR. Firstly, a 3D crystal of bR was dipped in cold ethanol at -100°C, and fractured using a knife. Then the fractured sample was mounted on a cryogenic stage of AFM, by which the fractured surface was observed in cold ethanol. In the P622 crystal of bR that was prepared by the membrane fusion method, a periodic arrangement on BR trimers was observed.

**1P289 光と磁場を用いた一分子 DNA 操作装置の開発
A novel method for manipulation of a single DNA molecule using optical and magnetic field****Masahiro Makuta**^{1,2}, Taishi Matsushima¹, Yoshihiro Murayama¹ (¹*Dept. of Appl. Phys., Tokyo Univ. of Agri. and Tech.*, ²*WPI-iCeMS, Kyoto Univ.*)

A nucleosome, a unit structure of folded DNA, is formed by DNA and proteins called histones, and is responsible for the condensation of DNA in the cell nucleus as well as for regulating gene expression. For understanding the mechanism by which the nucleosome is formed, the knowledge on the mechanical characteristics and electrostatic interaction of DNA with histone is critically important. The relationships between tension and length of DNA have been characterized by optical tweezers or AFM. However, the knowledge on torsional characteristics of DNA is very limited because it is difficult to operate the torsion with controlling DNA tension. Here, we developed a method to observe the responses of DNA to tension and torsion using optical and magnetic fields, respectively.