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Undulatory motion of bilayer membrane structures and fluctuation amplitudes on SANS/SAXS profile for large membrane wavelength
TAKUMI HAWA, VICTOR LEE, The University of Oklahoma — In this study, we have extended our previous investigation of the effect of bilayer membrane structures and fluctuation amplitude on small angles scatter (SAS) profiles to the cases with undulatory bending motions using 2D harmonic motion model. We consider the case that the aspect ratio (AR) = membrane wavelength (Y) / membrane thickness is larger than 5. Thicknesses of the bilayer membrane are accurately estimated based on the formula we have derived in our previous study. We have identified the shifting direction of the peak location, q_{peak} , which is distinctively different from the cases of $\text{AR} < 1$. We also identified a form factor q_Y , from which the value of Y (and consequently AR also) can be estimated accurately. We also found the relationship among AR, q_Y , and the amplitude and developed a chart which can be used to estimate the value of the membrane amplitude. Even though the applicability of the new chart is limited and some assumptions may be required, the values obtained through the new chart showed good agreements to the experimental results obtained in the past experiments.

Takumi Hawa
The University of Oklahoma

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