

## High Resolution Imaging of Protein 2D Crystal Using Frequency-Modulation Atomic Force Microscopy (FM-AFM) in Liquid Environment

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Dynamic force microscopy, which utilizes the resonance enhancement of the force sensitivity by oscillating the cantilever at the resonance frequency, is a very powerful operating mode for atomic force microscopy. In a vacuum environment, mechanical Q-factor of the cantilever is very high, hence many successful imaging with atomic and molecular resolution is reported. However, in liquid environment, mechanical Q-factor of the cantilever is greatly reduced due to the viscosity dumping of the liquid, and hence atomic resolution imaging is not achieved.

In this study, DFM in liquid technique is applied to two kinds of protein 2D crystal sheet whose structure and function are known to great deal, the purple membrane from *Halobacterium Salinarum* and photosynthetic membrane from *Rhodospirillum rubrum*, to assess the faithfulness of high resolution DFM images. Topographs of

**The submitted abstract was truncated.**

**We try to obtain a replacement.**

[1] T. Fukuma, M. Kimura, K. Kobayashi, K. Matsushige, and H. Yamada, *Rev. Sci. Instrum.*, **76**, 053704 (2005).

[2]

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