

Ultra-stable super-resolution fluorescence cryo-microscopy for correlative light and electron microscopy

Wei Ji, Xiaojun Xu, Yanhong Xue, Buyun Tian, Tao Xu
Institute of Biophysics, Chinese Academy of Sciences
Datun road 15, Chaoyang district, Beijing 100101, China
E-mail: jiwei@ibp.ac.cn

KEY WORDS: Cryo-chamber, Super-resolution, Cryo-FM, Cryo-PALM, CLEM

Remarkable progress in correlative light and electron cryo-microscopy (cryo-CLEM) has been made in the past decade. A crucial component for cryo-CLEM is a dedicated fluorescence cryo-microscopy. We developed an ultra-stable super-resolution cryo-FM that exhibits excellent thermal and mechanical stability. The temperature fluctuations in 10 hours are less than 0.06 K, and the mechanical drift over 5 hours is less than 200 nm in three dimensions. We have demonstrated the super-resolution imaging capability of this system (average single molecule localization accuracy ~ 13.0 nm). The results suggest that our system is particularly suitable for long-term observations, such as single molecule localization microscopy (SMLM) and cryogenic super-resolution correlative light and electron microscopy (csCLEM).

1. Liu, B., Xue, Y., Zhao, W., Chen, Y., Fan, C., Gu, L., Zhang, Y., Zhang, X., Sun, L., Huang, X., Ding, W., Sun, F., Ji, W., and Xu, T. Three-dimensional super-resolution protein localization correlated with vitrified cellular context. *Sci Rep* 513017, 13017 (2015).
2. Xu, X., Xue, Y., Tian, B., Gu, L., Li, W., Ji, W., Xu, T. Ultra-stable super-resolution fluorescence cryo-microscopy for correlative light and electron cryo-microscopy. *Science China Life Sciences*. doi: 10.1007/s11427-018-9380-3 (2018).