

Determining the ending time of localization microscopy experiments via structure resolving index

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ABSTRACT:

Super-resolution localization microscopy (SRLM) provides great opportunities for studying important biological problems with a spatial resolution far beyond diffraction limit [1]. In an SRLM experiment, researchers tend to acquire a huge amount of raw image frames (up to 40,000 frames [2]) to increase the number of detected molecules and hope to maximize the quality of a final super-resolution image. If we use a Hamamatsu Flash4.0 V3 sCMOS camera as the detector, the data volume of all raw images would be up to 312.5 GB (corresponding to 40,000 full raw image frames) for generating a final super-resolution image. In this case, the computer used to save the raw images can be easily filled up after several rounds of SRLM experiments, leading to huge pressure on further data transfer, storage and analysis. Therefore, it is desirable to establish an ending criterion to minimize data volume while ensuring the resolving ability of a final super-resolution image.

In this talk, we will present Structure Resolving Index (SRI) as an efficient criterion to end SRLM experiments as soon as possible. Using simulated and experimental data, we verify that SRI ensures the resolving power of a super-resolution image with minimized data volume. We believe that SRI has great potential to enable a more efficient use of SRLM by reducing the time and resource cost brought by extra data volume.

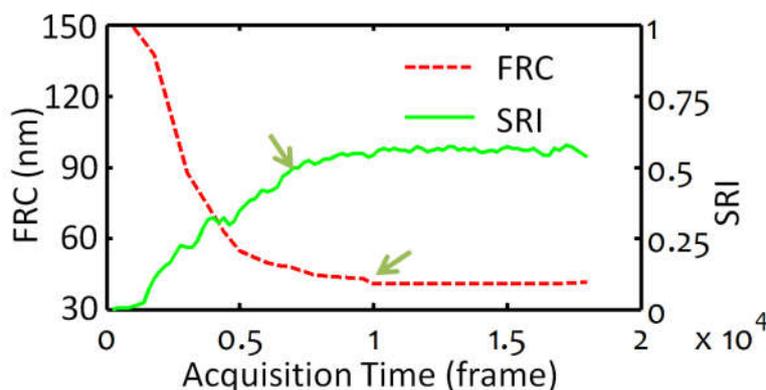


Fig 1. The ending time determined by SRI and FRC (Fourier Ring Correlation [3]).

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