

Supporting information

To

Quantifying Multi-state Cytoplasmic Molecular Diffusion in Bacterial Cells via Inverse Transform of Confined Displacement Distribution

Tai-Yen Chen[†], Won Jung[†], Ace George Santiago, Feng Yang, Łukasz Krzemiński, Peng Chen^{*}

Department of Chemistry and Chemical Biology, Cornell University, Ithaca, New York 14853,
USA

[†] Equal contributions

^{*} Correspondence author: pc252@cornell.edu

1. Validation of Brownian diffusion simulation results

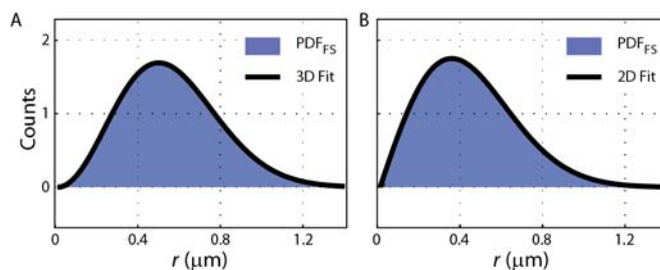


Figure S1. Displacement length distributions and fittings from simulated 3D and 2D diffusion data. (A) Displacement length distribution (PDF_{FS}) constructed from the 3D diffusion simulation data in free space. The distribution can be well fitted by Eq **Error! Reference source not found.** (black curve), giving the diffusion coefficient of $1.001 \pm 0.001 \mu\text{m}^2\text{s}^{-1}$, identical to the D_{input} of $1 \mu\text{m}^2\text{s}^{-1}$. (B) Same as A, but from 2D diffusion simulation data. The distribution can also be well fitted by Eq **Error! Reference source not found.** (black curve), giving the diffusion coefficient of 1.001 ± 0.001 , i.e., identical to the expected value of $1 \mu\text{m}^2\text{s}^{-1}$.

2. Forward transformation of displacement distribution (FTDD) in free space with [CTM]

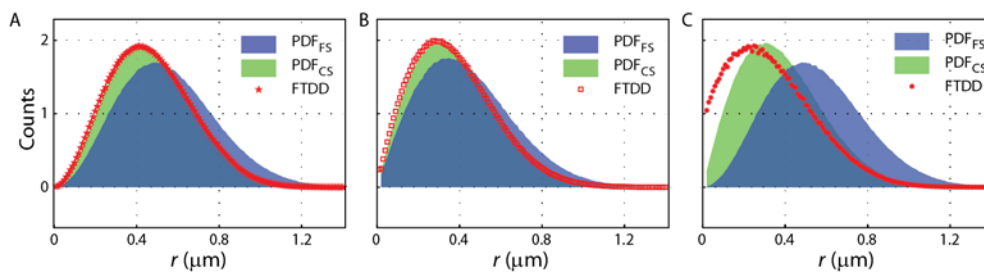


Figure S2. Forward transformation of displacement length distribution in free space into that in confined space using [CTM]. (A) The corresponding forward transformation results of **Error! Reference source not found.**D. The simulated displacement distributions in free space (blue shade), confined space (green shade), and forward transformation result (FTDD, red symbol) were plotted. (B) Same as A, but corresponds to **Error! Reference source not found.**F. (C) Same as A, but corresponds to **Error! Reference source not found.**H. Here the forward transformation also shows a clear deviation from displacement distribution in confined space because of dimension mismatch.