

## Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: Representative continuous 2D scan depicting a  $\lambda$  DNA tether transitioning from LF to HF in the presence of 20 nM Cy3-Smc5/6 (green) and 2 mM ATP.

File Name: Supplementary Movie 2

Description: Representative continuous 2D scan depicting a  $\lambda$  DNA tether transitioning from LF to HF in the presence of 20 nM Alexa555-Smc5/6 ATPase mutant (green), 10 nM LD650-RPA (red), and 2 mM ATP.

File Name: Supplementary Movie 3

Description: Representative continuous 2D scan depicting a  $\lambda$  DNA tether transitioning from LF to HF in the presence of 20 nM Cy3-Smc5/6 (green) and 10 nM LD650-SSB (red).