



**Fig. S3. Negative staining of intact PBS from *Anabaena* sp. strain PCC 7120.**

(A) Typical 2D classifications of PBS shown in end-on and side views. The red arrows point to the weak density of side rods (Rs2).

(B) Rotational correlation analysis of the centered end-on views from the reference-free classification. It shows two symmetric waves reflecting the PBS possesses a 2-fold symmetry.

(C) Fourier shell correlation (FSC) analysis of the reconstructions.  $FSC_{0.5}$  indicates a resolution of  $\sim 21$  Å.

(D) Matching pairs between projections (odd lines) and class averages (even lines) in the last iteration of the reconstruction.

(E,F) Comparison of 3D reconstructions with two-fold symmetry (E) and no symmetry (F).