



**Supplemental Figure 1.** Comparison of the heme-ligation structures of Cyt  $b_{559}$  in Cryo-EM structural models of different cyanobacterial PSIIs. (A) Overlay of native PSII-D model from *Thermosynechococcus* (PDB 7D1U, green) with intact PSII-D model from *Synechocystis* (PDB 7RCV, orange). (B) Overlay of native PSII-D model from *Thermosynechococcus* (PDB 7D1U, green) with inactive Apo-PSII monomer from *Synechocystis* (PDB 6WJ6, pink).