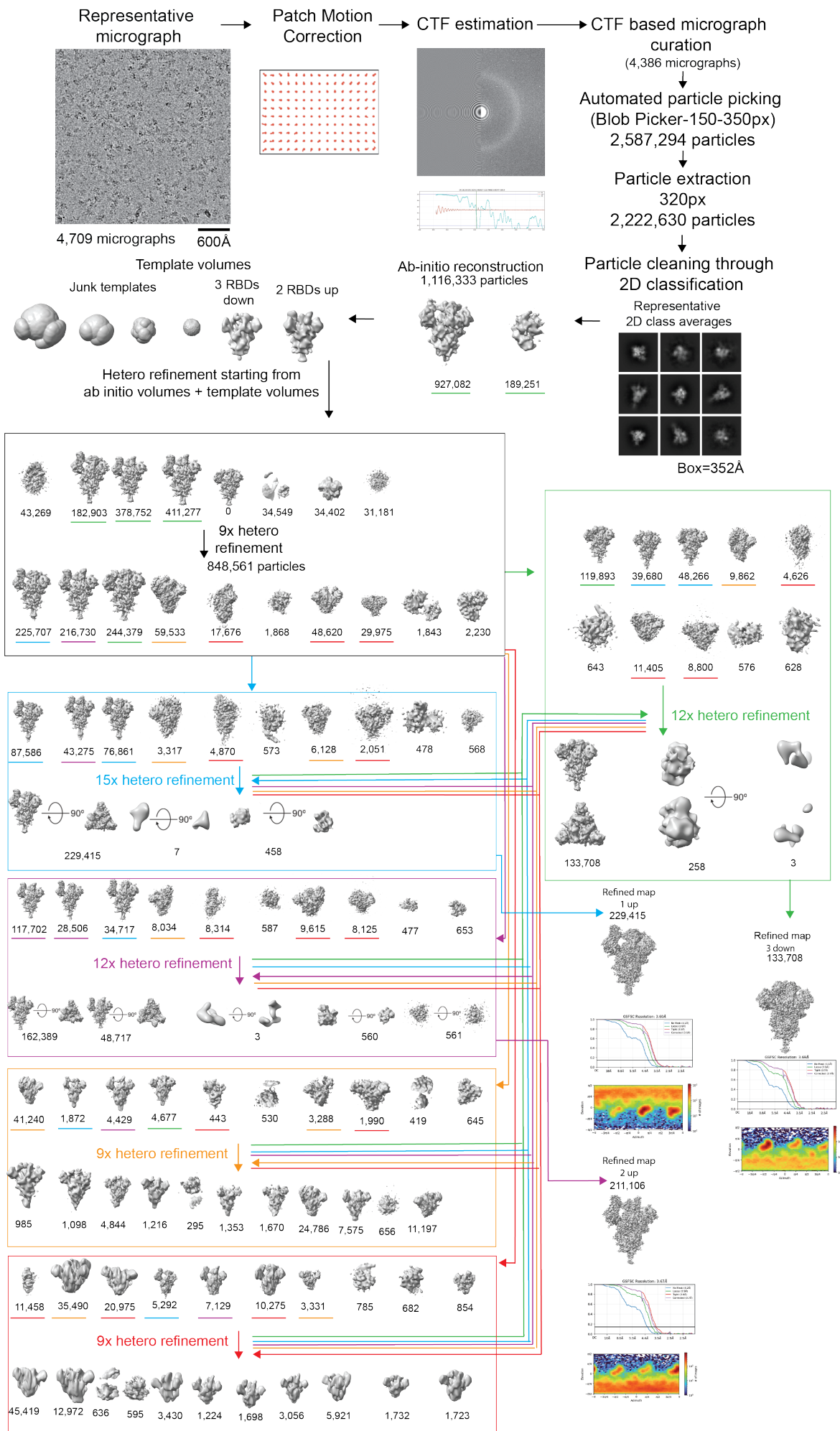
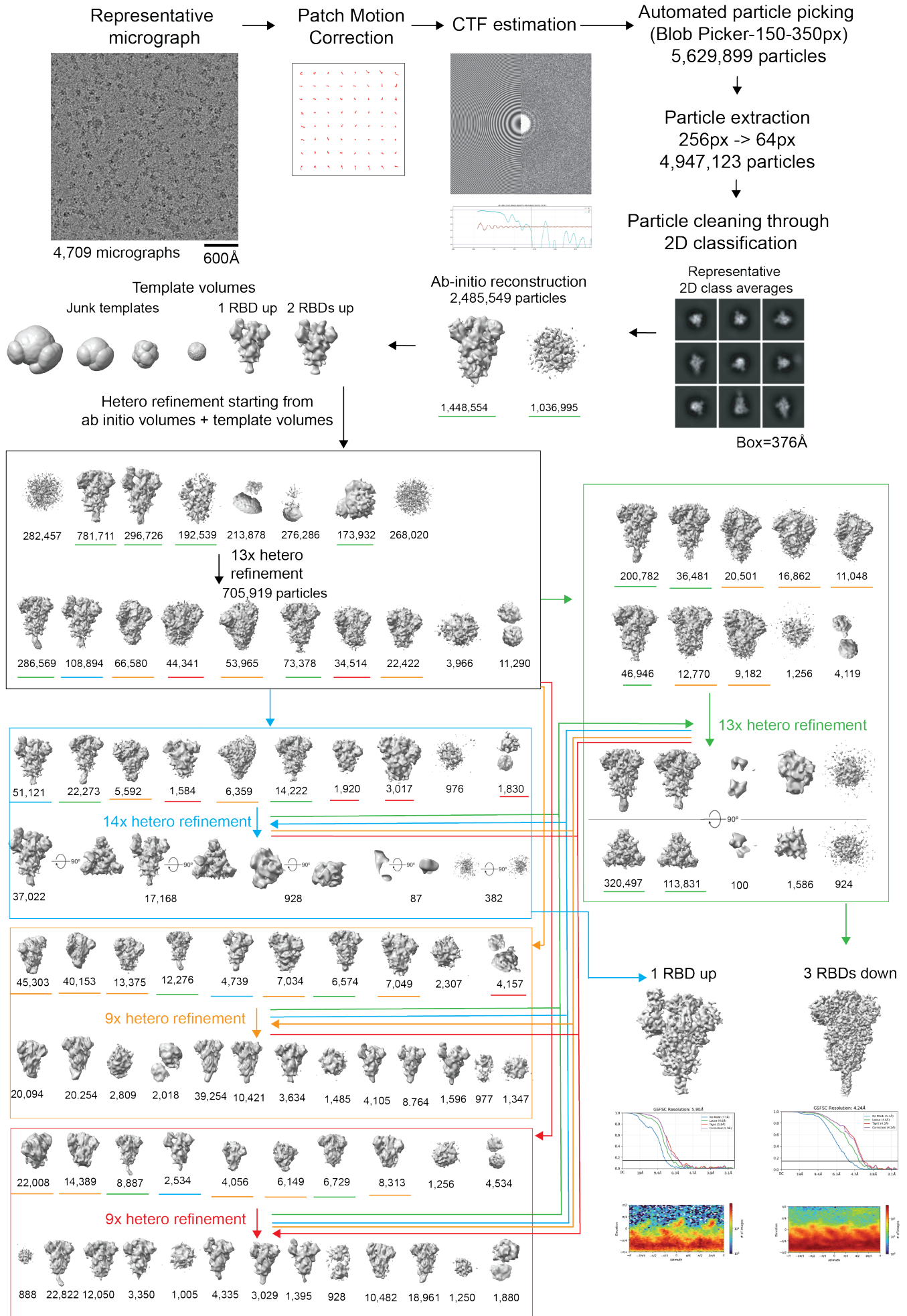


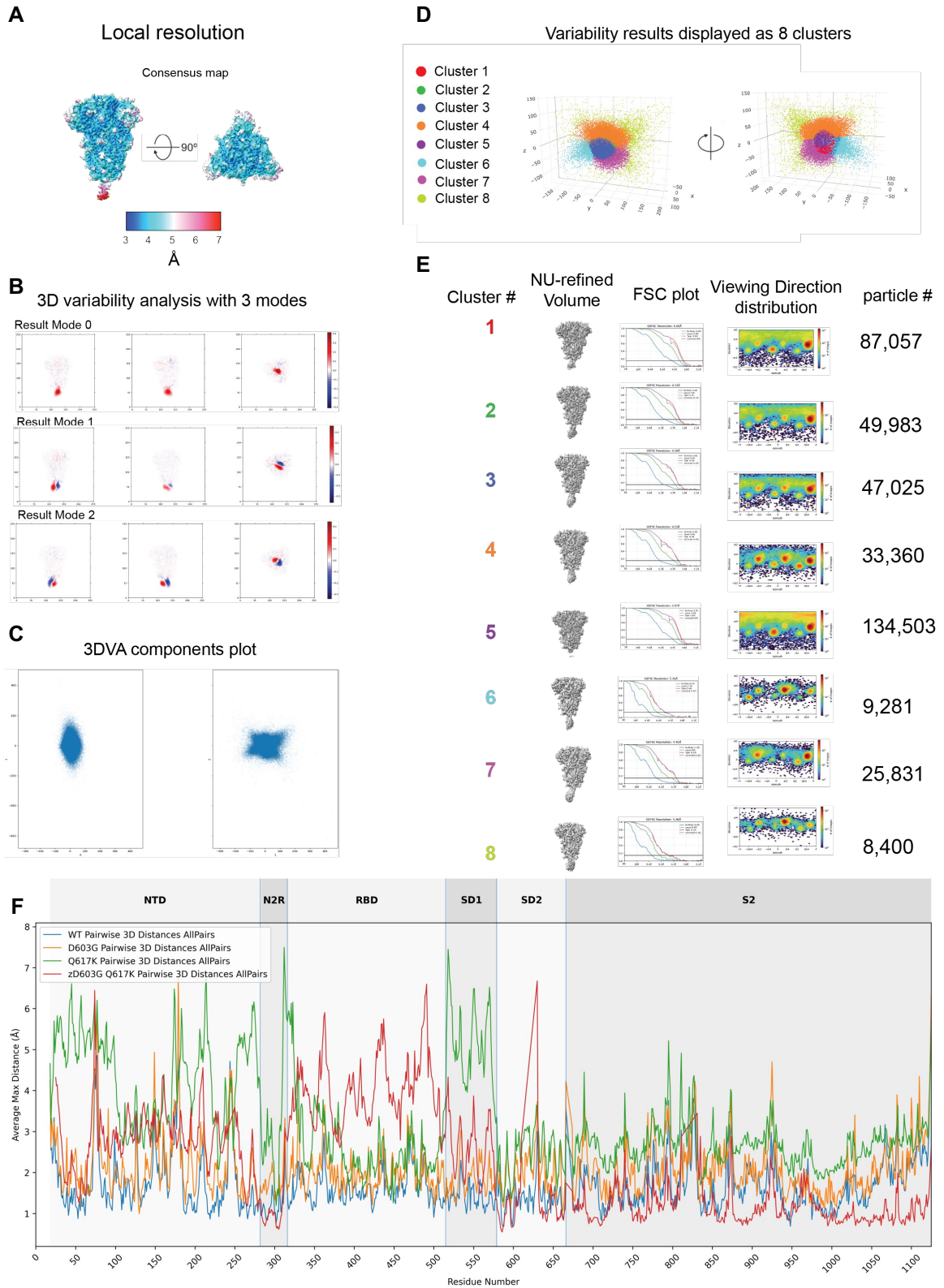
Supplementary Fig. 2: PRD0038-D603G-Q617K S Cryo-EM data processing



Supplementary Fig. 4: PRD0038-Q617K S Cryo-EM data processing

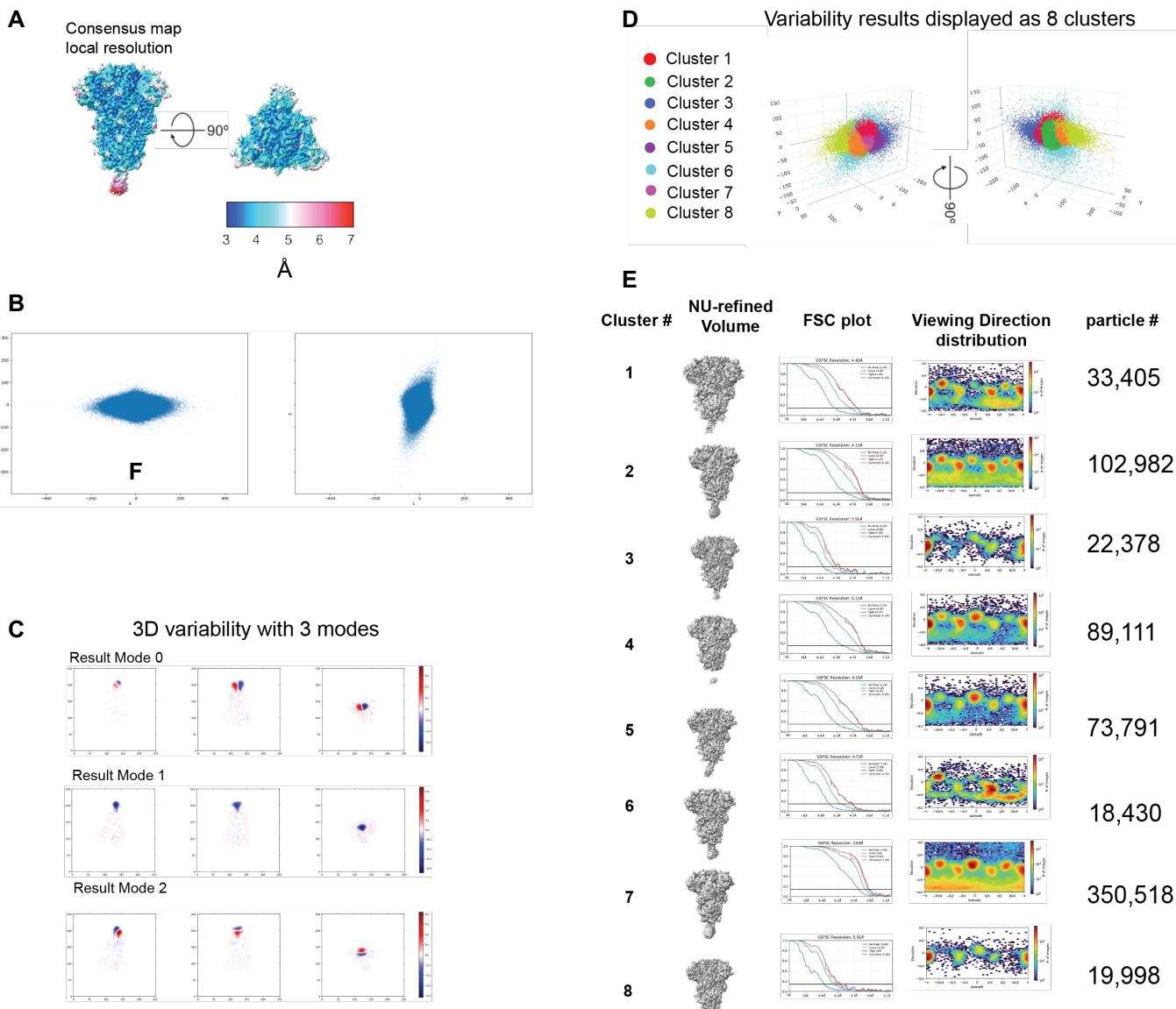


Supplementary Fig. 5: PRD0038 Wild-Type S cryo-EM 3DVA workflow



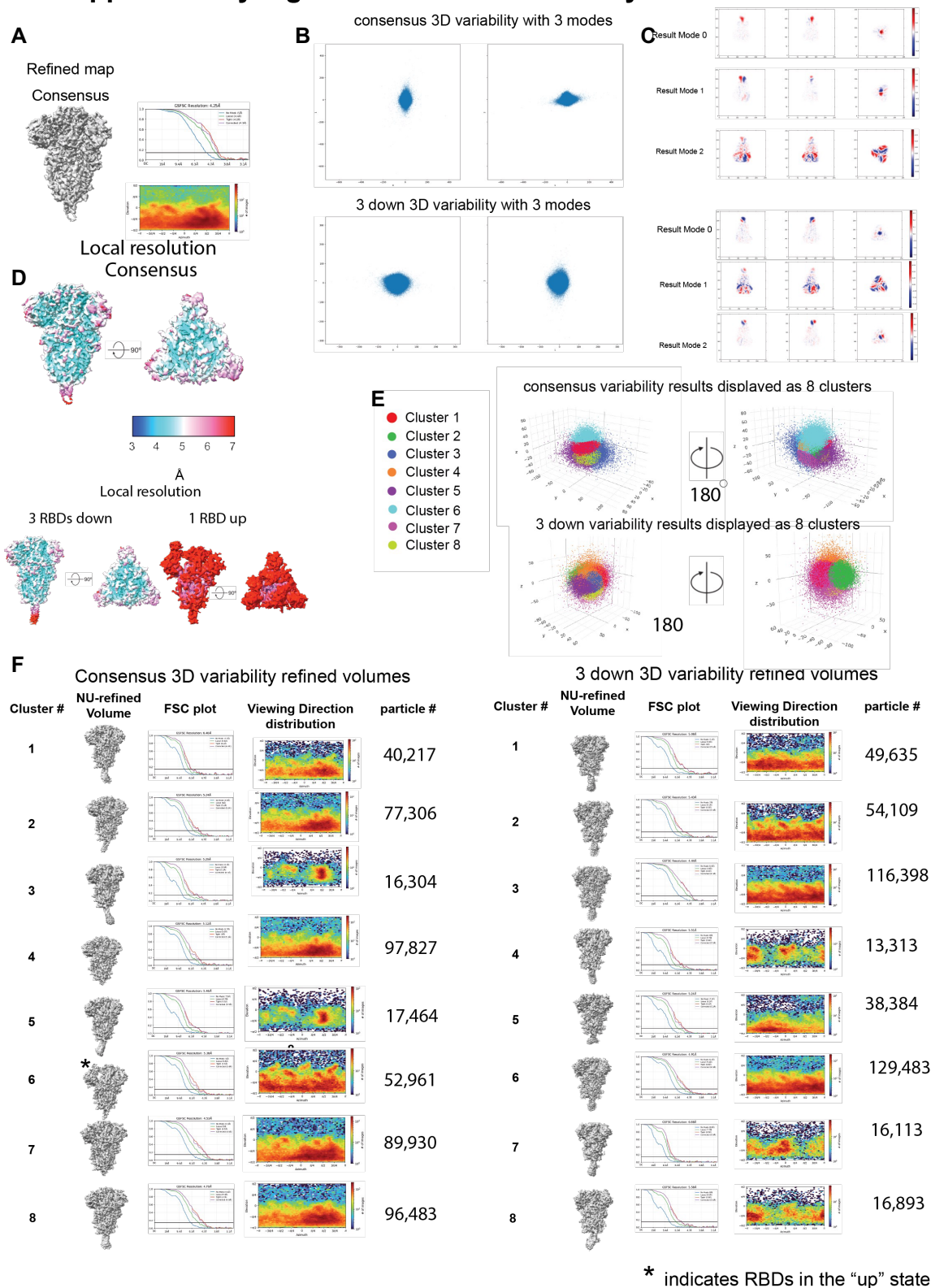
Variability analysis of S-PRD0038 WT cryo-EM dataset. A. Local resolution displayed on final refined volume. **B.** 3D variability analysis with 3 modes visualization. **C.** 3DVA components plot. **D.** Variability results displayed as 8 clusters colored as shown in the legend. **E.** Volumes, FSC plots, viewing distribution and particle numbers for each 3DVA particle cluster. **F.** Average max distance plotted for each residue across the S structure for the four datasets.

Supplementary Fig. 6: PRD0038-D603G S cryo-EM 3DVA workflow



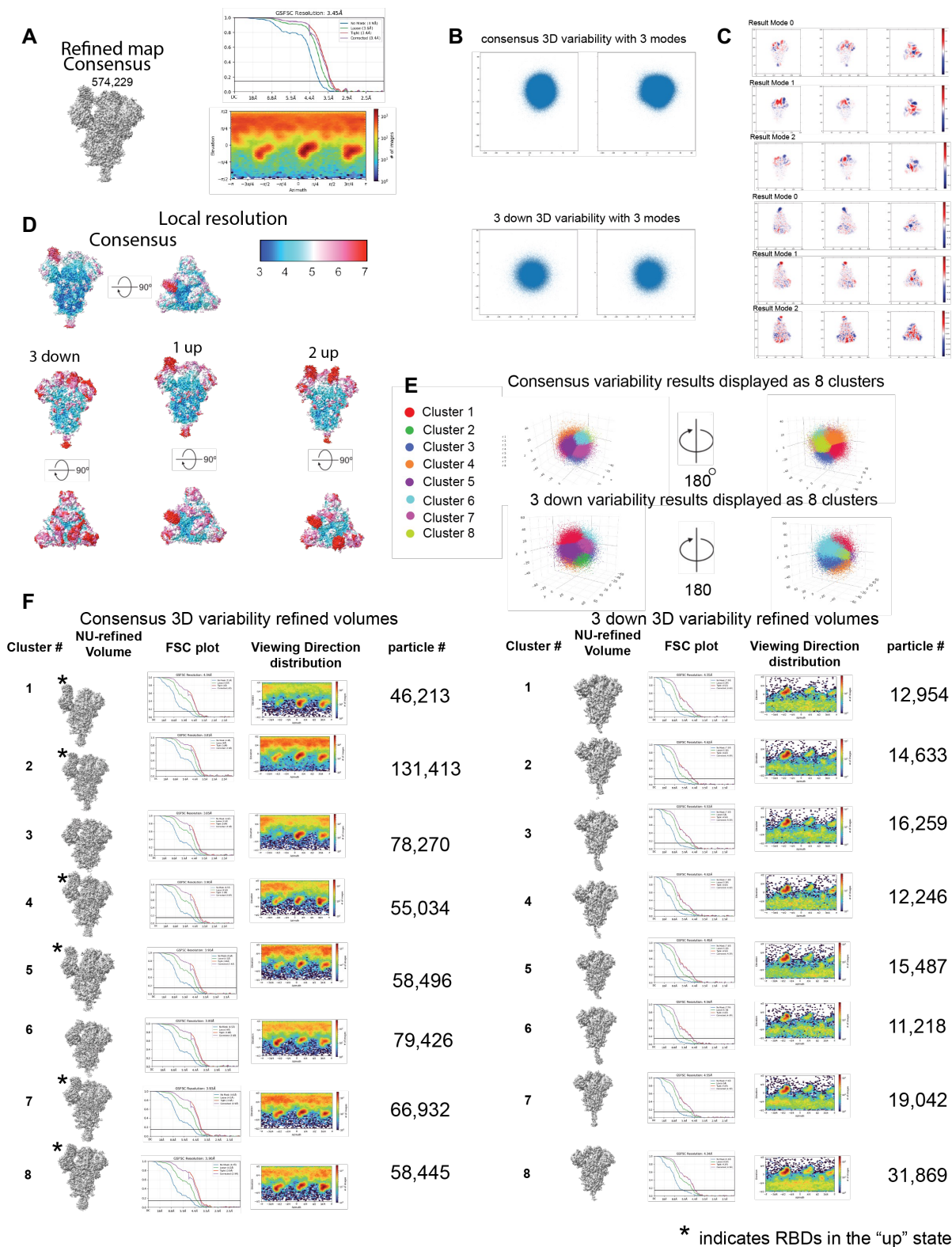
Variability analysis of S-PRD0038 D603G cryo-EM dataset. **A.** Local resolution displayed on final refined volume. **B.** 3DVA components plot. **C.** 3D variability analysis with 3 modes visualization. **D.** Variability results displayed as 8 clusters colored as shown in the legend. **E.** Volumes, FSC plots, viewing distribution and particle numbers for each 3DVA particle cluster.

Supplementary Fig. 7: PRD0038-Q617K S cryo-EM 3DVA workflow



Variability analysis of PRD0038-Q617K S cryo-EM dataset. **A.** S-PRD0038 Q617K final consensus structure with FSC plot and viewing direction distribution plots shown beside. **B.** 3DVA components plot. **C.** 3D variability analysis with 3 modes visualization. **D.** Local resolution plotted on refined volumes. **E.** Variability results displayed as 8 clusters colored as shown in the legend. **F.** Volumes, FSC plots, viewing distribution and particle numbers for each 3DVA particle cluster.

Supplementary Fig. 8: PRD0038-D603G-Q617K S cryo-EM 3DVA workflow



Variability analysis of PRD0038-Q617K S cryo-EM dataset. **A.** S-PRD0038 Q617K final consensus structure with FSC plot and viewing direction distribution plots shown beside. **B.** 3DVA components plot. **C.** 3D variability analysis with 3 modes visualization. **D.** Local resolution plotted on refined volumes. **E.** Variability results displayed as 8 clusters colored as shown in the legend. **F.** Volumes, FSC plots, viewing distribution and particle numbers for each 3DVA particle cluster.