

Description of Additional Supplementary Files:

File Name: Supplementary Movie 1 (SS-KPFM on LAOSTO for negative bias)

Description: Animation of the SS-KPFM dataset taken on LAO/STO for negative bias applied. from left to right: CPD Raw Data, GP reconstructed frame and corresponding profile over time.

File Name: Supplementary Movie 2 (SS-KPFM on LAOSTO for positive bias)

Description: Animation of the SS-KPFM dataset taken on LAO/STO for positive bias applied. from left to right: CPD Raw Data, GP reconstructed frame and corresponding profile over time.

File Name: Supplementary Movie 3 (SS-KPFM on TiO₂ after +10V)

Description: Animation of the SS-KPFM dataset taken on TiO₂ after +10V bias applied. From left to right: CPD Raw Data, GP reconstructed frame and corresponding profile over time.

File Name: Supplementary Movie 4 (SS-KPFM on TiO₂ after +8V)

Description: Animation of the SS-KPFM dataset taken on TiO₂ after +8V bias applied. From left to right: CPD Raw Data, GP reconstructed frame and corresponding profile over time.

File Name: Supplementary Movie 5 (SS-KPFM on TiO₂ after +5V)

Description: Animation of the SS-KPFM dataset taken on TiO₂ after +5V bias applied. From left to right: CPD Raw Data, GP reconstructed frame and corresponding profile over time.

File Name: Supplementary Movie 6 (SS-KPFM on TiO₂ after -5V)

Description: Animation of the SS-KPFM dataset taken on TiO₂ after -5V bias applied. From left to right: CPD Raw Data, GP reconstructed frame and corresponding profile over time.

File Name: Supplementary Movie 7 (SS-KPFM on TiO₂ after -8V)

Description: Animation of the SS-KPFM dataset taken on TiO₂ after -8V bias applied. From left to right: CPD Raw Data, GP reconstructed frame and corresponding profile over time.

File Name: Supplementary Movie 8 (SS-KPFM on TiO₂ after -10V)

Description: Animation of the SS-KPFM dataset taken on TiO₂ after -10V bias applied. From left to right: CPD Raw Data, GP reconstructed frame and corresponding profile over time.