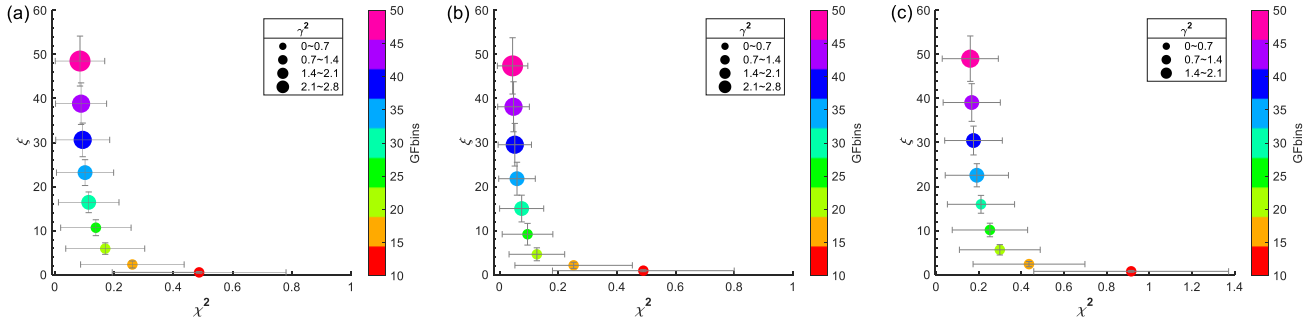


Fig. S1. "L-curve" showing the dependence of reconstruction residual, χ^2, and the smoothness, ξ, on the number of GF bins of pre-defined GF-PDFs with (**a**) one mode, (**b**) two modes, and (**c**) three modes, respectively. The symbol size represents the error in inverted GF-PDF, γ^2. Whiskers represent standard deviation. The inversion is conducted using unregularized LSQ method.

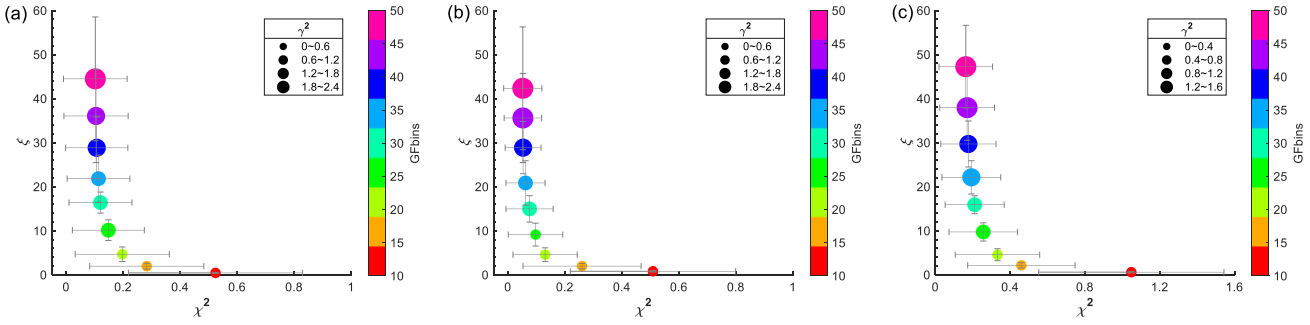


Fig. S2. "L-curve" showing the dependence of reconstruction residual, χ^2, and the smoothness, ξ, on the number of GF bins of pre-defined GF-PDFs with (**a**) one mode, (**b**) two modes, and (**c**) three modes, respectively. The symbol size represents the error in inverted GF-PDF, γ^2. Whiskers represent standard deviation. The inversion is conducted using 0^{th} order Tikhonov regularization method.

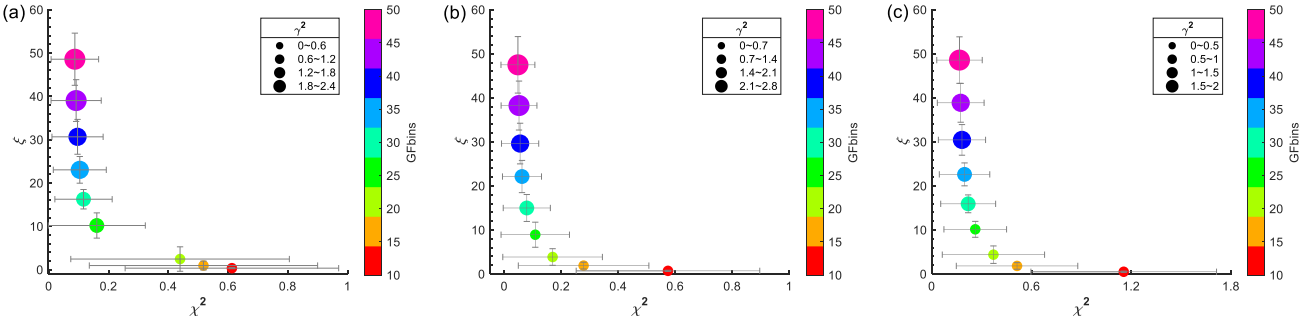
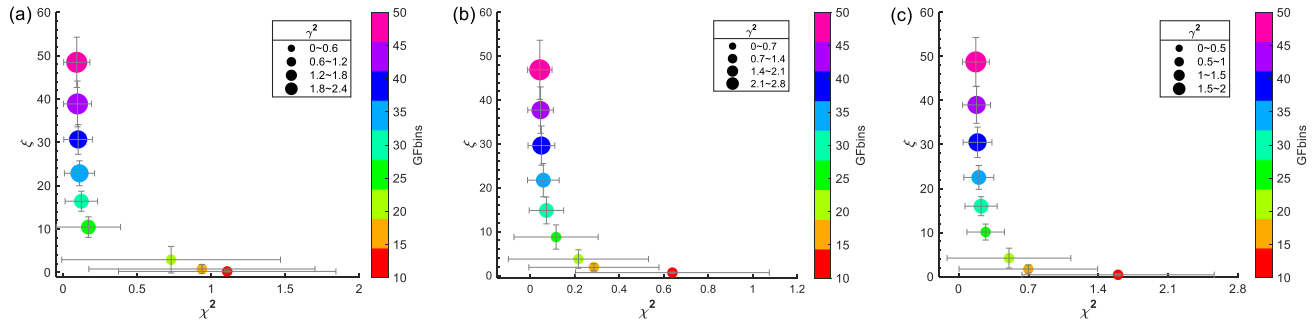


Fig. S3. "L-curve" showing the dependence of reconstruction residual, χ^2, and the smoothness, ξ, on the number of GF bins of pre-defined GF-PDFs with (**a**) one mode, (**b**) two modes, and (**c**) three modes, respectively. The symbol size represents the error in inverted GF-PDF, γ^2. Whiskers represent standard deviation. The inversion is conducted using 1^{st} order Tikhonov regularization method.



15 **Fig. S4.** "L-curve" showing the dependence of reconstruction residual, χ^2, and the smoothness, ξ, on the number of GF bins of pre-defined GF-PDFs with (**a**) one mode, (**b**) two modes, and (**c**) three modes, respectively. The symbol size represents the error in inverted GF-PDF, γ^2. Whiskers represent standard deviation. The inversion is conducted using 2nd order Tikhonov regularization method.