

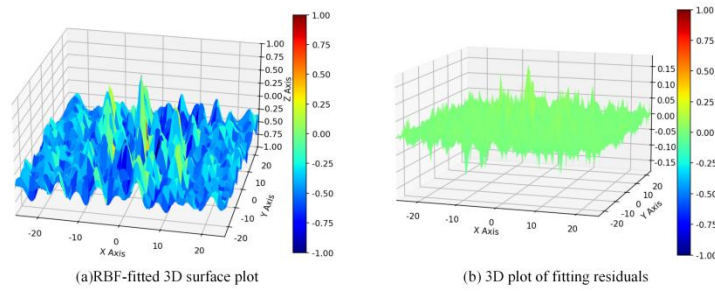
Supplementary Information

A Mathematical Modeling Method of the EHT Synthesized Beam for Radio Synthesis Imaging

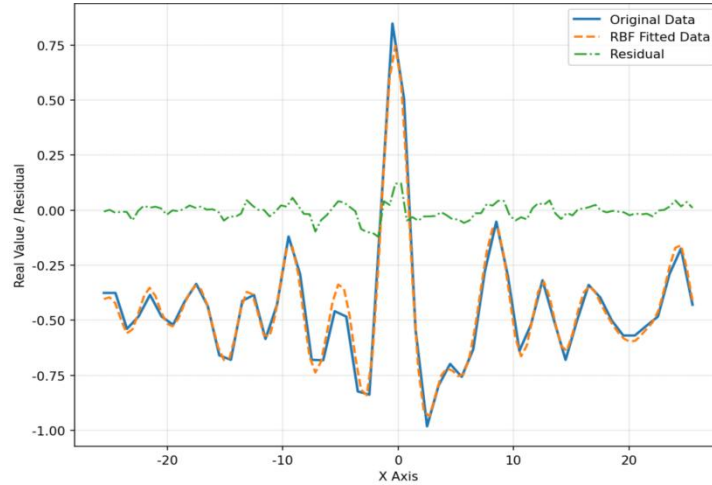
Li Zhang and Guoshengyi Wu

Supplementary Section A: Fitting Results for Other Basis Functions

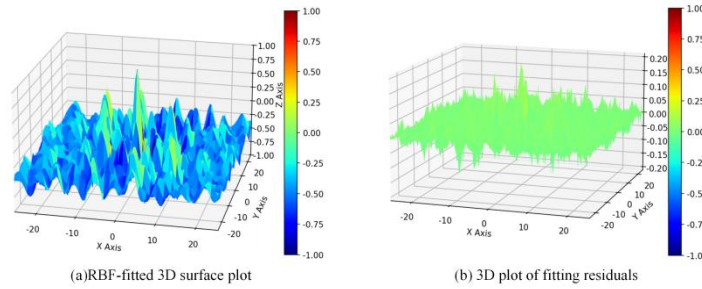
This supplementary section presents the fitting results of five comparative basis functions—Thin Plate, Multiquadric, Inverse, Cubic, and Gaussian—under identical experimental conditions, to support the rationale behind the selection of Linear RBF in the main text. The results for the Gaussian function reflect only its performance under the fixed parameter setting $\varepsilon = 2.0$ without any parameter optimization; these results cannot be generalized to suggest that the Gaussian function is universally unsuitable for other RBF modeling tasks.



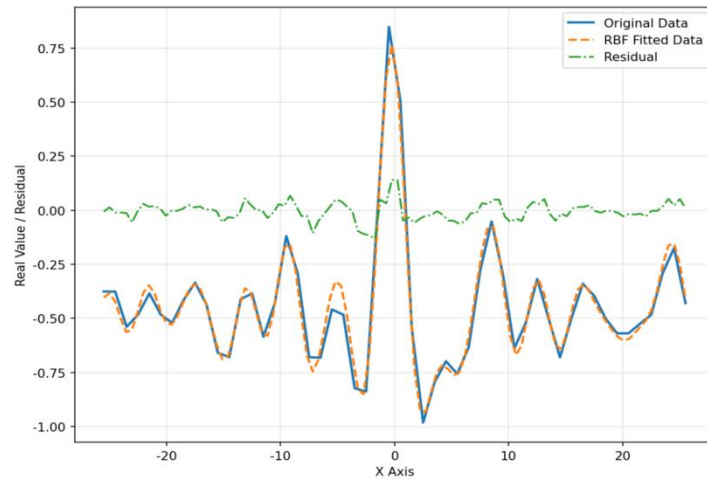
Supplementary Fig. S1: Fitting result using the Thin_plate basis function with epsilon = 2.0



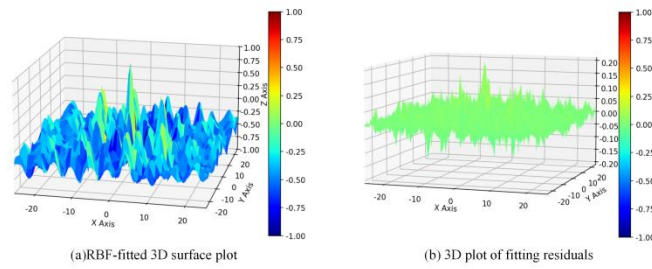
Supplementary Fig. S2: Middle profile of the Thin_plate RBF fitting result with epsilon = 2.0



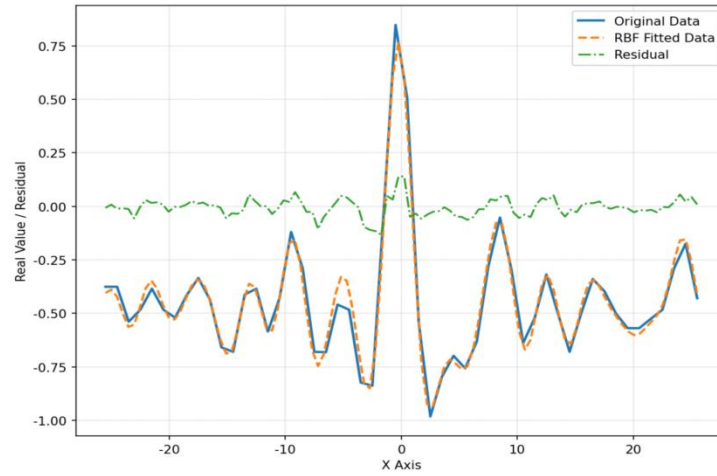
Supplementary Fig. S3: Fitting result using the Multiquadric basis function with epsilon = 2.0



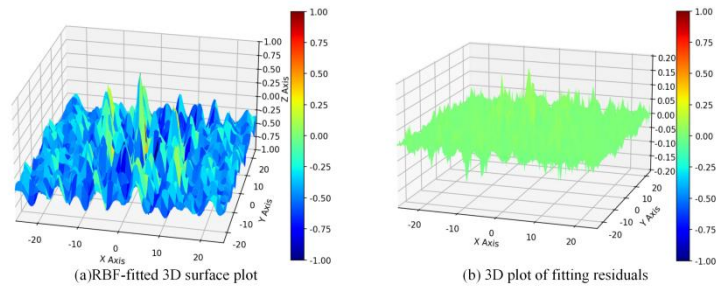
Supplementary Fig. S4: Middle profile of the Multiquadric RBF fitting result with epsilon = 2.0



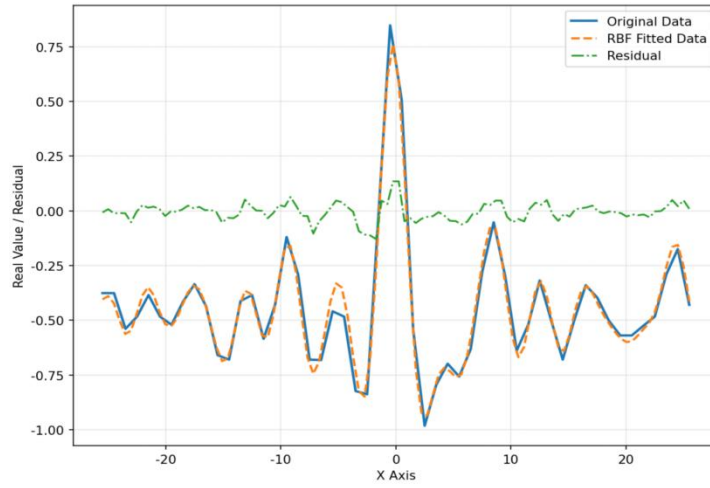
Supplementary Fig. S5: Fitting result using the Inverse basis function with epsilon = 2.0



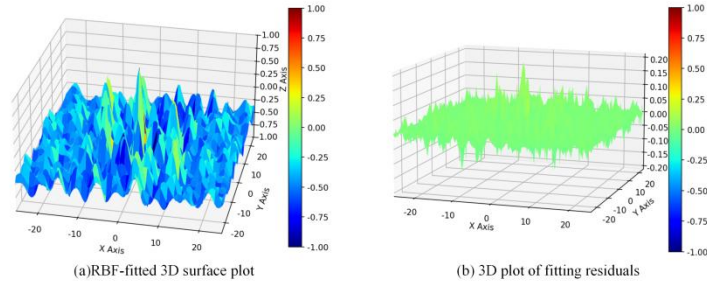
Supplementary Fig. S6: Middle profile of the Inverse RBF fitting result with epsilon = 2.0



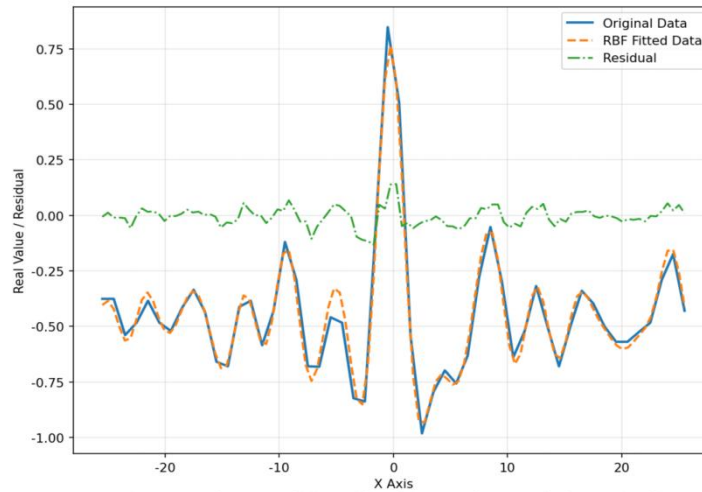
Supplementary Fig. S7: Fitting result using the Cubic basis function with epsilon = 2.0



Supplementary Fig. S8: Middle profile of the Cubic RBF fitting result with epsilon = 2.0



Supplementary Fig. S9: Fitting result using the Gaussian basis function with epsilon = 2.0



Supplementary Fig. S10: Middle profile of the Gaussian RBF fitting result with epsilon = 2.0

Supplementary Section B: Partial Coefficients of the LiRBM Fitting Function

The complete set of 4,096 RBF center coordinates and corresponding weight coefficients is provided as Supplementary Data S1.

Supplementary Table S1. Partial Coefficients of the LiRBM Fitting Function

Index	x_i	y_i	w_i
1	-31.5	-31.5	0.0475067161
2	-30.5	-31.5	0.0170472755

Index	x_i	y_i	w_i
3	-29.5	-31.5	-0.1116405977
4	-28.5	-31.5	-0.1129745038
5	-27.5	-31.5	0.0501582116
6	-26.5	-31.5	0.0620207573
7	-25.5	-31.5	-0.0368431556
8	-24.5	-31.5	0.0612913242
9	-23.5	-31.5	0.1148454071
10	-22.5	-31.5	-0.0380336102
11	-21.5	-31.5	-0.1420417473
12	-20.5	-31.5	-0.0580922795
13	-19.5	-31.5	0.0932667635
14	-18.5	-31.5	0.1700412471
15	-17.5	-31.5	-0.1162200527
16	-16.5	-31.5	-0.1914628191
17	-15.5	-31.5	0.0102614293
18	-14.5	-31.5	0.1875784109
19	-13.5	-31.5	0.0719138494
20	-12.5	-31.5	-0.0764178987
21	-11.5	-31.5	-0.0400855768
22	-10.5	-31.5	-0.0304913135
23	-9.5	-31.5	-0.0279489731
24	-8.5	-31.5	-0.0407114133
25	-7.5	-31.5	-0.0235159664
26	-6.5	-31.5	0.0553174339
27	-5.5	-31.5	0.1235798012
28	-4.5	-31.5	0.0786122399
29	-3.5	-31.5	0.0010289234
30	-2.5	-31.5	0.0030640554
31	-1.5	-31.5	-0.0516016757
32	-0.5	-31.5	-0.1239268427
33	0.5	-31.5	-0.0496664591
34	1.5	-31.5	0.0182078282

Index	x_i	y_i	w_i
35	2.5	-31.5	0.0276615421
36	3.5	-31.5	0.0090132715
37	4.5	-31.5	-0.0016642436
38	5.5	-31.5	0.0291333286
39	6.5	-31.5	0.0738403944
40	7.5	-31.5	0.0214363739
41	8.5	-31.5	-0.1154136123
42	9.5	-31.5	-0.1116612450
43	10.5	-31.5	0.0378386527
44	11.5	-31.5	0.1048767554
45	12.5	-31.5	0.0707190591
46	13.5	-31.5	-0.0145962936
47	14.5	-31.5	-0.0211399856
48	15.5	-31.5	0.0128144495
49	16.5	-31.5	-0.0077866298
50	17.5	-31.5	-0.1126075420
