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Supporting information for article:

Phase retrieval of coherent diffractive images with global optimization algorithms

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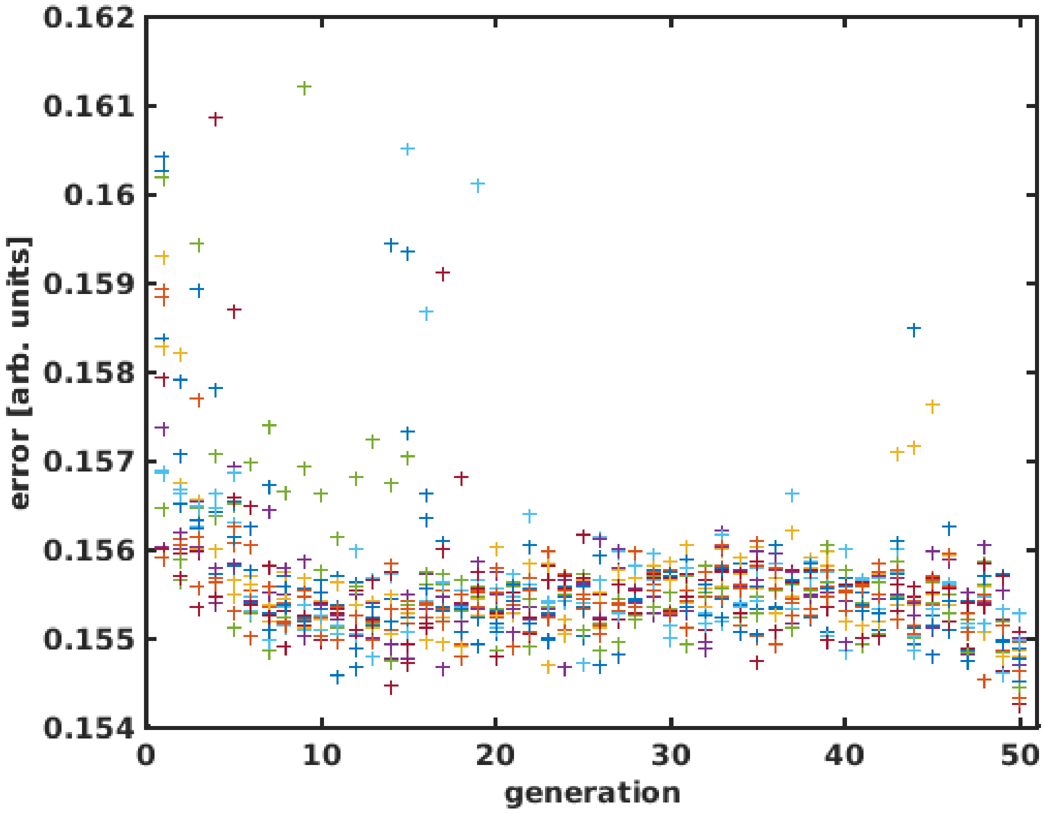

Figure S1. The distribution of the error metric σ as a function of generation for the GHIO framework shown in Fig. 4. Each generation consists of sixteen HIO reconstructions.

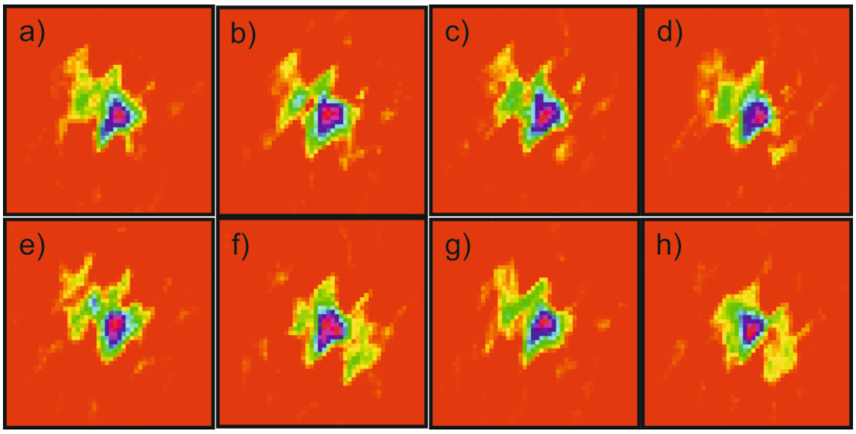

Figure S2. Example of a basis set of $N_{\mathrm{var}} = 8$ images (a-h) used in a GA-HIO reconstruction, illustrating different features obtained from the same experimental far-field diffraction pattern (Fig. 4b). Each image was reconstructed with a random initial input followed by 250 iterations of the HIO algorithm and then 50 iterations of ER algorithm.

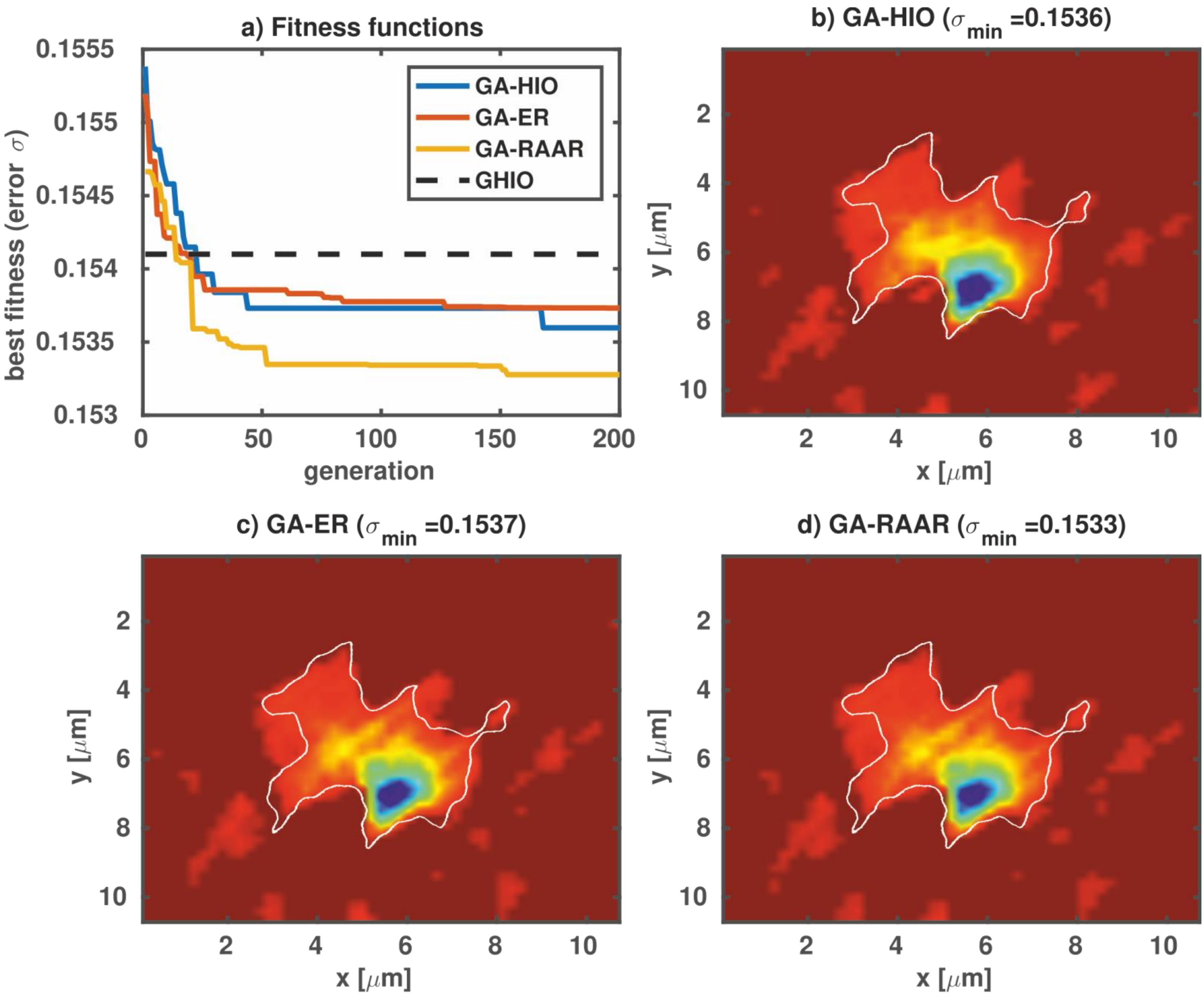

Figure S3. Image reconstruction with a GA combined with different local optimization algorithms (HIO, ER, and RAAR) using the same basis set ($N_{\mathrm{var}} = 16$). (a) The best fitness values as a function of generation. The lowest error value obtained with the GHIO ($\sigma_{\mathrm{GHIO}} = 0.1541$, dashed line) is added for comparison. (b-d) Corresponding RIs. A contour figure of the sample (solid white lines) extracted from the SEM image in Fig. 4a is added to the RIs to guide the eyes.

Table S1. Optimized parameters for the GA-HIO, GA-ER, and GA-RAAR reconstructions as shown in Fig. S3, using the same basis set of $N_{\text{var}} = 16$ model images.

Optimized parameters	Method		
	GA-HIO	GA-ER	GA-RAAR
β	0.0405755	-	0.997885
$\{a_{\text{opt}}^k\}$ with $k = [1,16]$	0.526017	0.571869	0.62138
	0.266922	0.473293	0.440705
	0.860446	0.701427	0.664367
	0.216545	0.385316	0.489837
	0.93436	0.977012	0.505524
	0.306774	0.335916	0.442343
	0.434555	0.307406	0.188692
	0.797268	0.975561	0.900127
	0.467704	0.866826	0.990634
	0.03102	0.506324	0.356312
	0.673777	0.785709	0.732172
	0.0810479	0.596317	0.487194
	0.80869	0.558502	0.752509
	0.0787579	0.191194	0.281883
	0.500301	0.570277	0.382553
	0.6847	0.57834	0.493275