Practical Image Reconstruction

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Phase retrieval is an extremely difficult optimization problem due the fact that its search space is at the same time non-smooth, non-convex and very large. Throughout the years much attention was paid to the problem of reconstructing an image from its oversampled diffraction pattern alone. This has led to well known algorithms like the Hybrid Input Output. But most of these efforts did not try to incorporate in the algorithm knowledge about the noise that is associated with the acquisition of diffraction images. Here we present current phase retrieval algorithms so that they minimize the effect of noise associated with short exposures CCD data acquisition. This leads to more accurate and faster reconstructions for real data.