Phase retrieval from coherent x-ray diffraction data utilizing pre-determined partial information[1] SANG SOO KIM, HYON CHOL KANG, SHASHI MARATHE, SU NAM KIM, DO YOUNG NOH[2], Gwangju Institute of Science and Technology, ALEC R. SANDY, Argonne National Laboratory, SURESH NARAYAN, DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING, GWANGJU INSTITUE OF SCIENCE AND TECHNOLOGY COLLABORATION, ADVANCED PHOTON SOURCE, ARGONNE NATIONAL LABORATORY COLLABORATION — We developed a phase retrieval algorithm that utilizes pre-determined partial phase information to overcome insufficient oversampling ratio in diffraction data. Implementing the Fourier modulus projection and the modified support projection manifesting the pre-determined information, a generalized difference map and HIO (Hybrid Input-Output) algorithms are developed. Optical laser diffraction data as well as simulated x-ray diffraction data are used to illustrate the validity of the proposed algorithm, which revealed the strength and the limitations of the algorithm. Finally, the proposed algorithm is applied to reconstruct images from coherent x-ray diffraction data of Au patterns. The proposed algorithm can expand the applicability of the diffraction based image reconstruction.

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