Direct three-dimensional tomographic reconstruction and phase retrieval of far-field coherent diffraction patterns

We present an alternative numerical reconstruction algorithm for direct tomographic reconstruction of a sample's refractive indices from the measured intensities of its far-field coherent diffraction patterns. We formulate the well-known phase-retrieval problem in ptychography in a tomographic framework which allows for simultaneous reconstruction of the illumination function and the sample's refractive indices in three dimensions. Our iterative reconstruction algorithm is based on the Levenberg-Marquardt algorithm and we demonstrate the performance of our proposed method with simulated and real datasets.

General information
State: Published
Organisations: Department of Energy Conversion and Storage, Scientific Computing, Department of Applied Mathematics and Computer Science, Imaging and Structural Analysis, Technical University of Denmark
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Number of pages: 9
Publication date: 2019
Peer-reviewed: Yes

Publications information
Journal: Physical Review A (Atomic, Molecular and Optical Physics)
Volume: 99
Issue number: 2
Article number: 023801
ISSN (Print): 2469-9926
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.46 SJR 1.288 SNIP 0.886
Web of Science (2017): Impact factor 2.909
Web of Science (2017): Indexed yes
Scopus rating (2016): CiteScore 2.25 SJR 1.482 SNIP 0.985
Web of Science (2016): Impact factor 2.925
Web of Science (2016): Indexed yes
Scopus rating (2015): CiteScore 2.06 SJR 1.747 SNIP 1.008
Web of Science (2015): Impact factor 2.765
Web of Science (2015): Indexed yes
Scopus rating (2014): CiteScore 2.46 SJR 2.201 SNIP 1.163
Web of Science (2014): Indexed yes
Scopus rating (2013): CiteScore 2.86 SJR 2.305 SNIP 1.166
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Scopus rating (2012): CiteScore 2.81 SJR 2.519 SNIP 1.231
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
Scopus rating (2011): CiteScore 2.79 SJR 2.316 SNIP 1.252
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
Scopus rating (2010): SJR 2.4 SNIP 1.211
Web of Science (2010): Indexed yes
Scopus rating (2009): SJR 2.469 SNIP 1.346
Web of Science (2009): Indexed yes
Scopus rating (2008): SJR 2.536 SNIP 1.231
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 2.524 SNIP 1.203
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.834 SNIP 0.968
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.394 SNIP 0.806
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.473 SNIP 0.714
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 1.492 SNIP 0.925
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 2.066 SNIP 1.098
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.949 SNIP 1.356
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 2.594 SNIP 1.606
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 2.619 SNIP 1.366
Original language: English
Electronic versions:
1808.02109.pdf
DOIs: 10.1103/PhysRevA.99.023801
Research output: Research - peer-review > Journal article – Annual report year: 2019