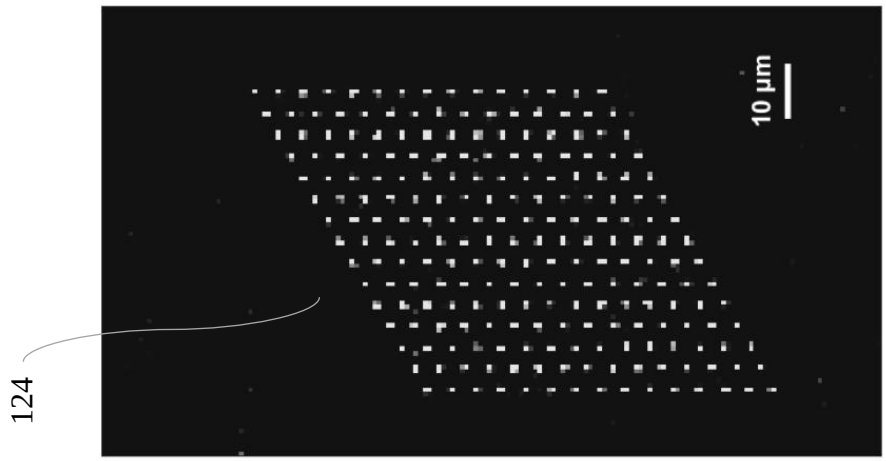

10 µm
124

FIG. 1B

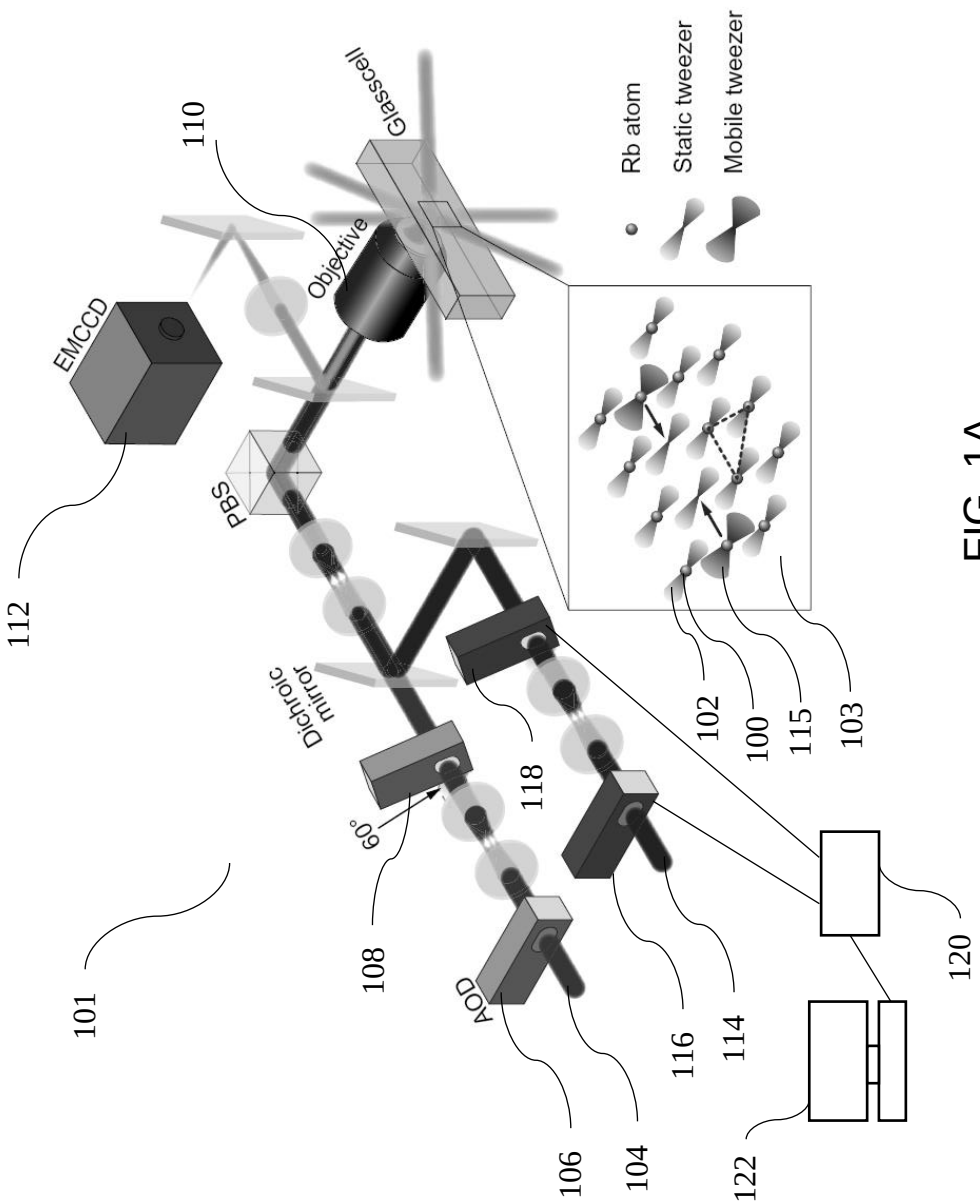

Rb atom
Static tweezer
Mobile tweezer
Glasscell
Objective
110
EMCCD
112
PBS
Dichroic mirror
60°
108
101
118
AOD
106
104
116
114
122
120
102
100
115
103

FIG. 1A

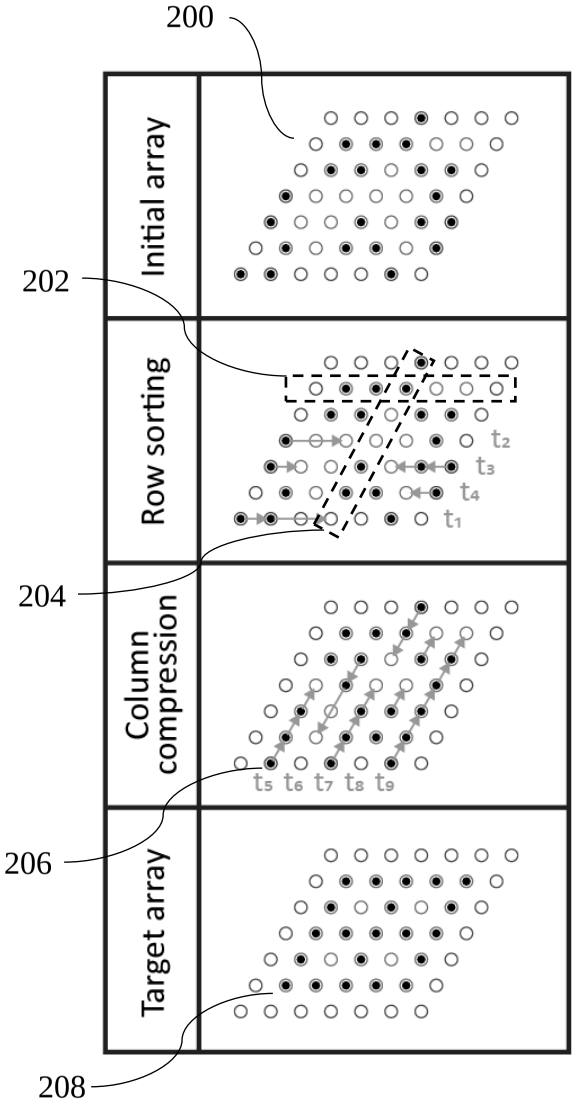


FIG. 2A

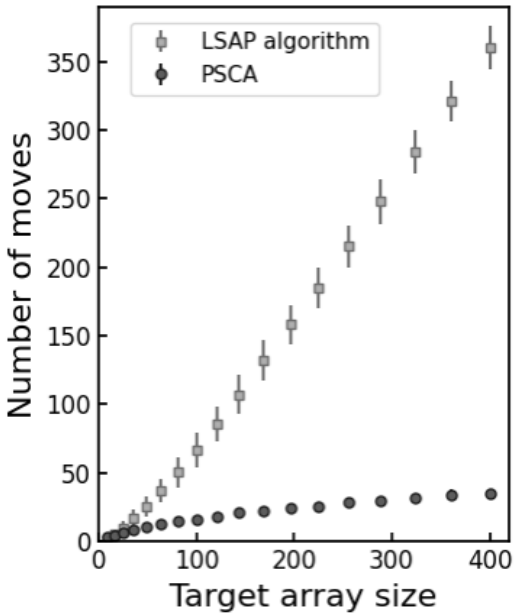


FIG. 2B

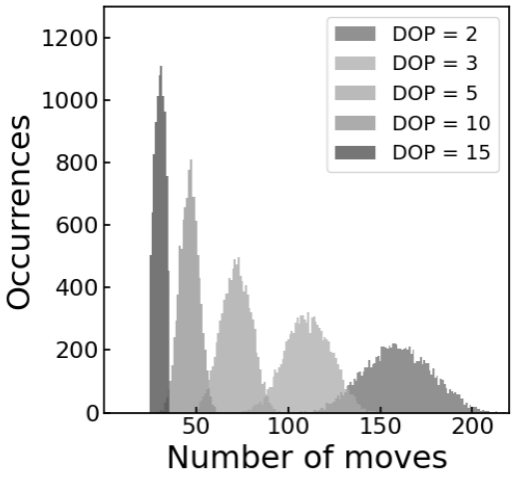


FIG. 2C

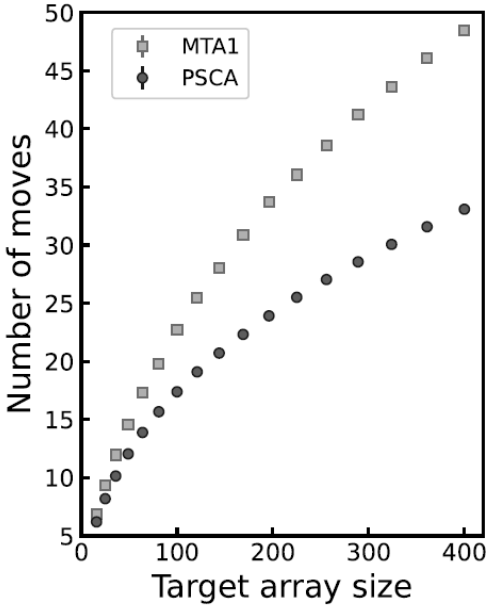


FIG. 3A

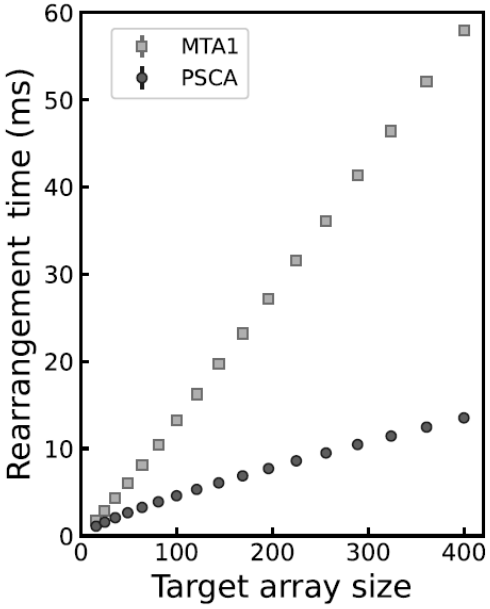


FIG. 3B

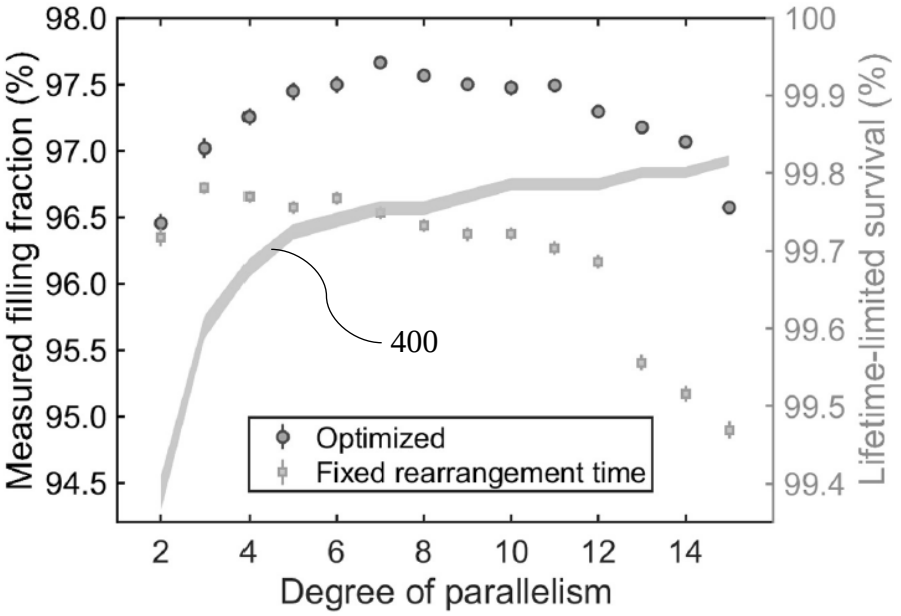


FIG. 4

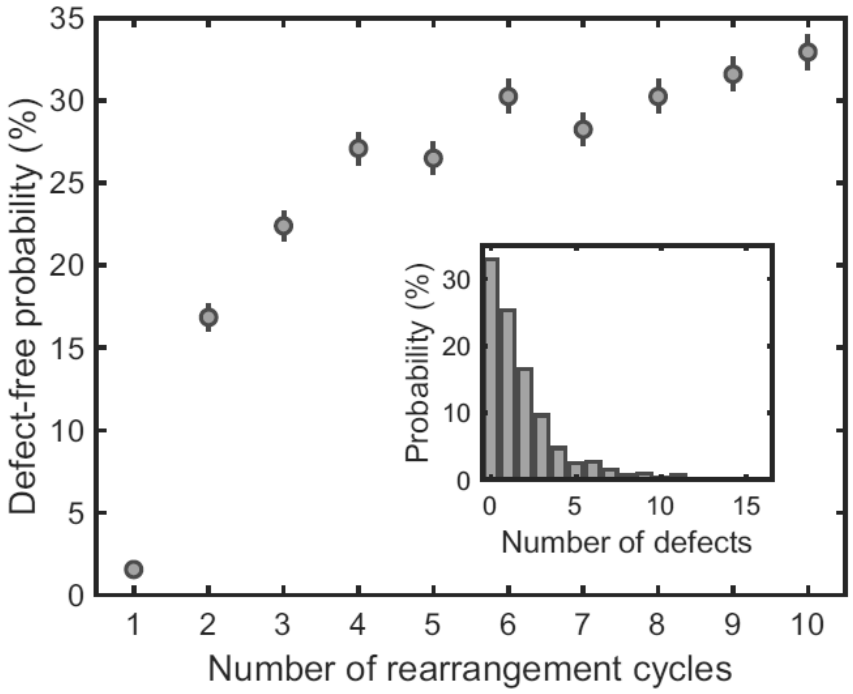

Defect-free probability (%)
Number of rearrangement cycles
Probability (%)
Number of defects

FIG. 5

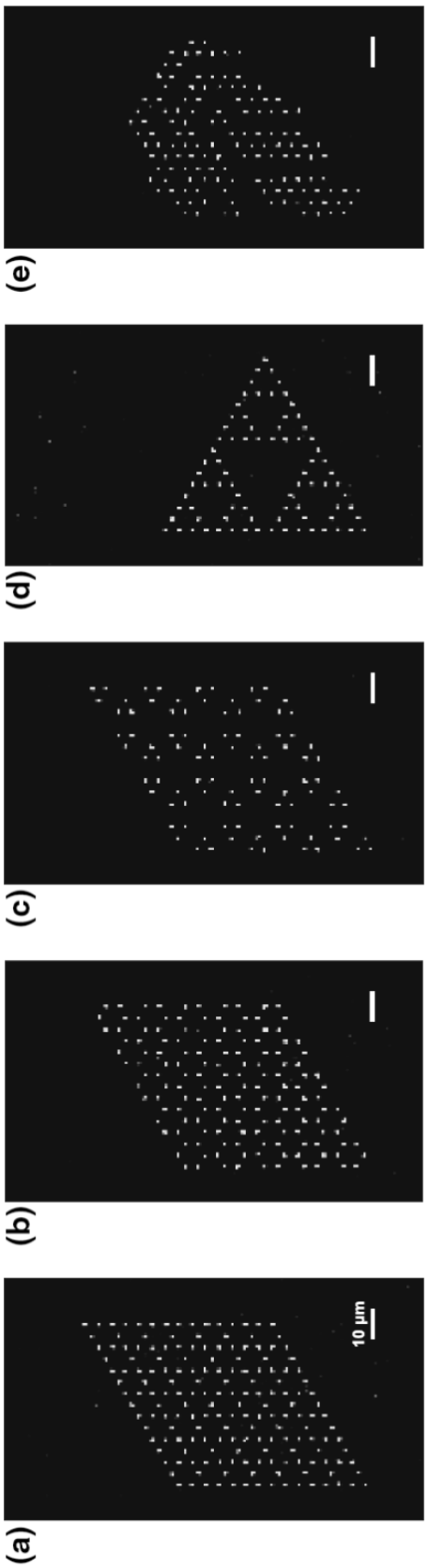


FIG. 6A

FIG. 6B

FIG. 6C

FIG. 6D

FIG. 6E

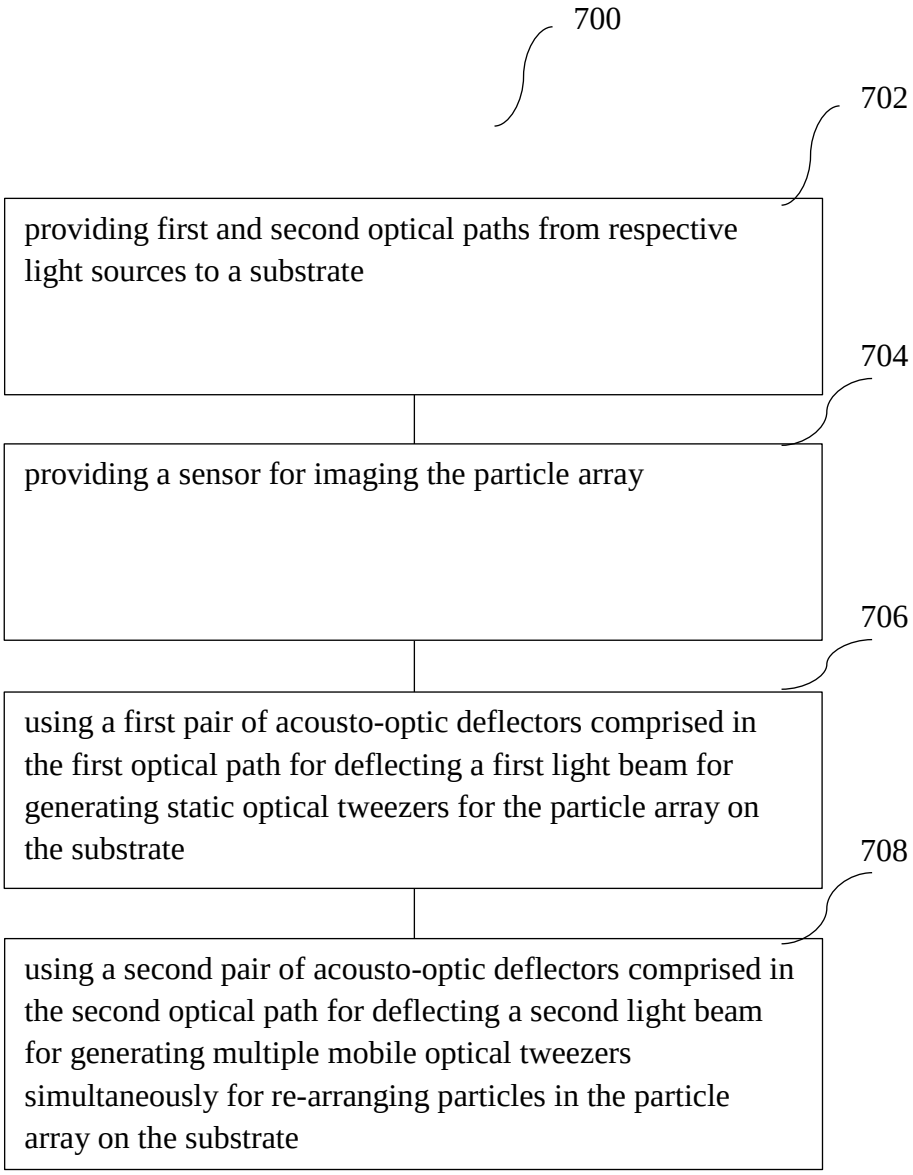

700
702
providing first and second optical paths from respective light sources to a substrate
704
providing a sensor for imaging the particle array
706
using a first pair of acousto-optic deflectors comprised in the first optical path for deflecting a first light beam for generating static optical tweezers for the particle array on the substrate
708
using a second pair of acousto-optic deflectors comprised in the second optical path for deflecting a second light beam for generating multiple mobile optical tweezers simultaneously for re-arranging particles in the particle array on the substrate

FIG. 7

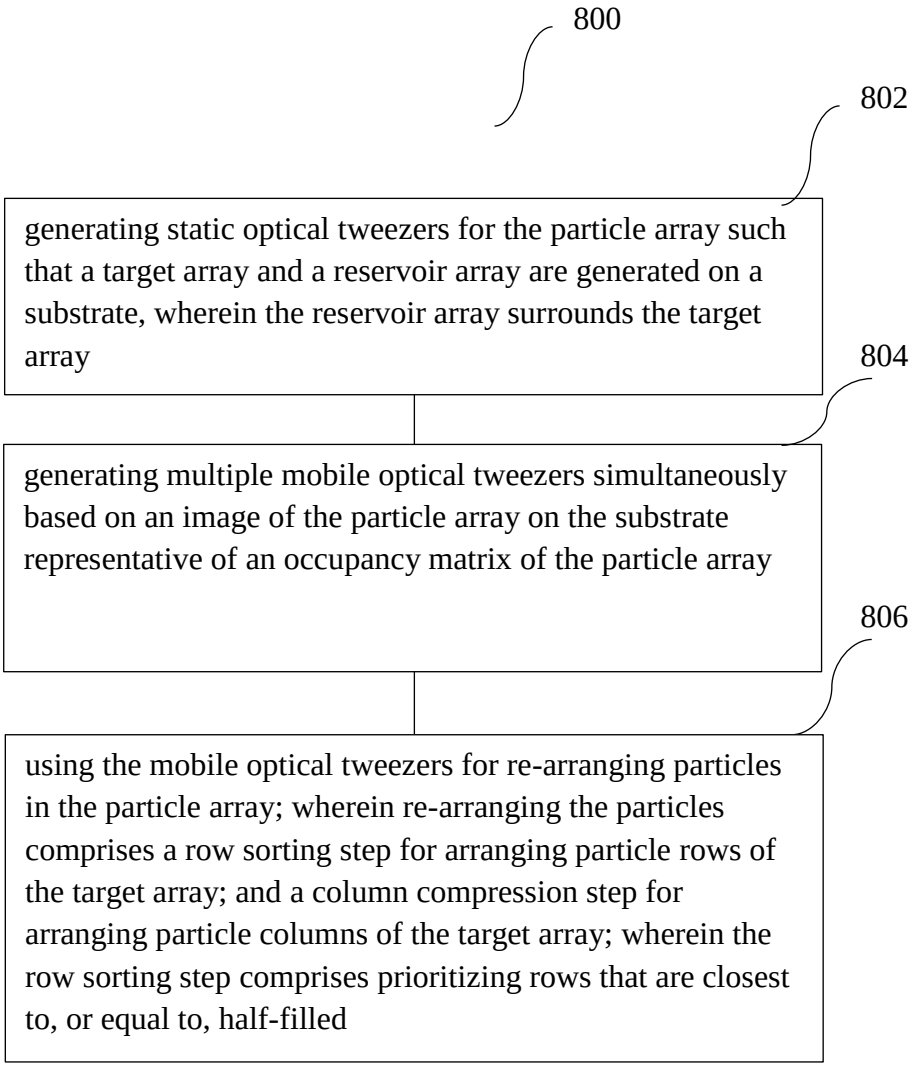

800
802
generating static optical tweezers for the particle array such that a target array and a reservoir array are generated on a substrate, wherein the reservoir array surrounds the target array
804
generating multiple mobile optical tweezers simultaneously based on an image of the particle array on the substrate representative of an occupancy matrix of the particle array
806
using the mobile optical tweezers for re-arranging particles in the particle array; wherein re-arranging the particles comprises a row sorting step for arranging particle rows of the target array; and a column compression step for arranging particle columns of the target array; wherein the row sorting step comprises prioritizing rows that are closest to, or equal to, half-filled

FIG. 8