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(54) Title: APPARATUS AND METHOD FOR CONTINUOUS LOADING OF NEUTRAL ATOM REGISTERS

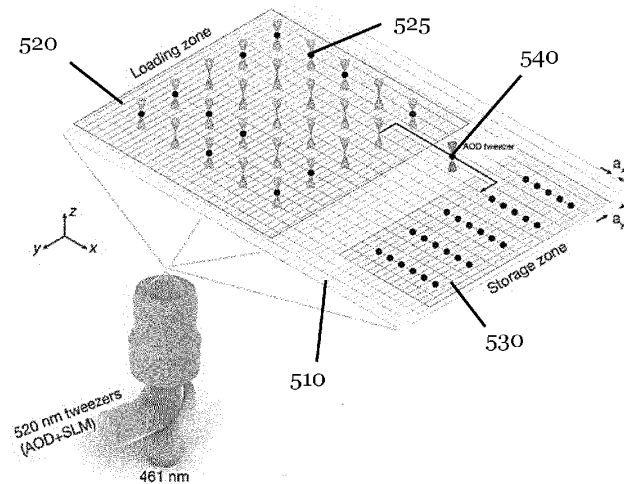


Fig. 5

(57) Abstract: The present disclosure relates to trapping and manipulating neutral atoms for quantum computing, quantum simulation and metrology. In one aspect a method comprises loading a plurality of neutral atoms into a loading trap array arranged adjacent to or at least partially collocated with a storage trap array, selectively removing neutral atoms in a first electronic state $|1\rangle$ from the storage trap array, determining a trap occupancy of neutral atoms in the storage trap array in a second electronic state $|2\rangle$, and of neutral atoms in the loading trap array, and moving, based on the determined trap occupancy of the neutral atoms in the storage trap array and in the loading trap array, neutral atoms from the loading trap array to one or more non-occupied trapping sites of the storage trap array. The method may further comprise shelving the neutral atoms in a shelving state.

[Continued on next page]

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