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(71) Applicant: **PARITY QUANTUM COMPUTING GMBH** [AT/AT]; Technikerstraße 21a, 6020 Innsbruck (AT).

(72) Inventor: **LECHNER, Wolfgang**; Winkelweg 9, 6063 Rum (AT).

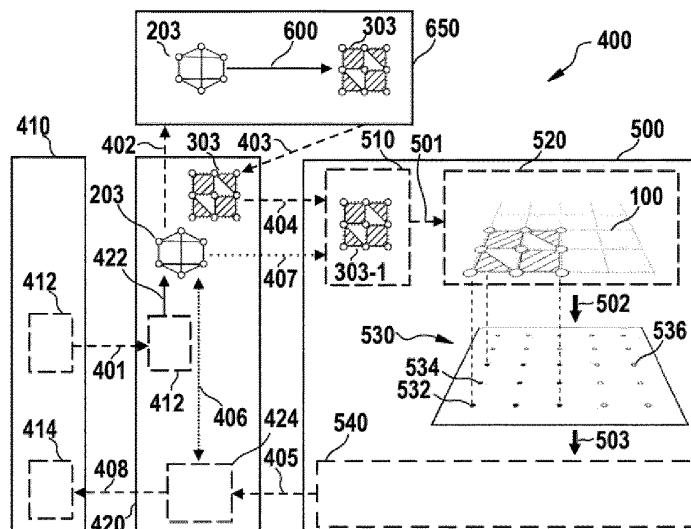
(74) Agent: **ZIMMERMANN & PARTNER PATENTANWÄLTE MBB**; Josephsplatzstr. 15, 80331 München (DE).

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(54) Title: QUANTUM OPERATION CONTROL LAYOUT FOR A QUANTUM COMPUTATION

Fig. 20



(57) Abstract: According to an embodiment, a method of determining a quantum operation control layout for a quantum computation on a quantum system is provided. The quantum computation is to be carried out on constituents of the quantum system arranged in accordance with a mesh. Vertices of the mesh represent possible sites for the constituents of the quantum system. Each cell of the mesh indicates that quantum interactions between constituents of the quantum system arranged in that cell are possible during the quantum computation. The method includes providing a data set including data representing hyperedges of a hypergraph. The method includes determining a set of generalized cycles. The generalized cycles contain hyperedges of the hypergraph or contain hyperedges of an enlarged hypergraph. The enlarged hypergraph at least includes the hyperedges of the hypergraph and an additional hyperedge. Therein, a maximal length of generalized cycles of the set of generalized cycles is not greater than a maximal vertex number of the

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cells of the mesh. The method includes determining a mesh mapping that maps data representing the hyperedges of the hypergraph or of the enlarged hypergraph to the vertices of the mesh. Therein, each generalized cycle of a constraining subset of the set of generalized cycles consists of hyperedges mapped to a cell of the mesh. The method includes generating the quantum operation control layout. The quantum operation control layout includes data indicating layout vertices of the mesh. Each layout vertex corresponds to a hyperedge mapped according to the mesh mapping. The layout includes data indicating layout vertex sets. Each layout vertex set consists of layout vertices within a cell of the mesh that correspond to a generalized cycle of the constraining subset of generalized cycles.