

Time-tronics: from temporal printed circuit board to quantum computer

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Time crystalline structures can be created in periodically driven systems. They are temporal lattices which can reveal different condensed matter behaviours ranging from Anderson localization in time to temporal analogues of many-body localization or topological insulators. However, the potential practical applications of time crystalline structures have not yet been demonstrated.

We pave the way for time-tronics where temporal lattices are like printed circuit boards for realization of a broad range of quantum devices. The elements of these devices can correspond to structures of dimensions higher than three and can be arbitrarily connected and reconfigured at any moment.

Moreover, our approach allows for the construction of a quantum computer, enabling quantum gate operations for all possible pairs of qubits. Our findings indicate that the limitations faced in building devices using conventional spatial crystals can be overcome by adopting crystalline structures in time.

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