The quantum computer game: citizen science[1] SIDSE DAMGAARD, KLAUS MØLMER, JACOB F. SHERSON, University of Aarhus, Denmark — Progress in the field of quantum computation is hampered by daunting technical challenges. Here we present an alternative approach to solving these by enlisting the aid of computer players around the world. We have previously examined a quantum computation architecture involving ultracold atoms in optical lattices and strongly focused tweezers of light [1]. In The Quantum Computer Game (see http://www.scienceathome.org/), we have encapsulated the time-dependent Schrödinger equation for the problem in a graphical user interface allowing for easy user input. Players can then search the parameter space with real-time graphical feedback in a game context with a global high-score that rewards short gate times and robustness to experimental errors. The game which is still in a demo version has so far been tried by several hundred players. Extensions of the approach to other models such as Gross-Pitaevskii and Bose-Hubbard are currently under development. The game has also been incorporated into science education at high-school and university level as an alternative method for teaching quantum mechanics. Initial quantitative evaluation results are very positive.

[1] C. Weitenberg et al, Phys. Rev. A, 84, 032322 (2011)

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