

OSF17-2017-000013

Abstract for an Invited Paper
for the OSF17 Meeting of
the American Physical Society

The final steps towards neutral atom quantum computers - All you need is light

KATHARINA GILLEN, California Polytechnic State University, San Luis Obispo

Quantum computing will allow us to solve problems that are intractable on conventional computers by exploiting the quantum phenomena of superposition of states and entanglement between two or more quantum bits (qubits). Several directions for constructing a quantum computer are actively being explored, with significant progress in many of them. In recent years, large strides towards a fully functional quantum computer have been made using neutral atoms trapped by light. In this talk, I will discuss the ideas for physically implementing each individual requirement for a quantum computer in this approach, as well as show some of the latest experimental successes by leading researchers in this field. Finally, I will highlight what contributions our undergraduate researchers make to this puzzle at Cal Poly, San Luis Obispo. We are computationally and experimentally exploring laser light patterns that could be useful for storing atomic qubits, such as the diffraction pattern formed behind an array of pinholes.