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Universal gates based on targeted phase shifts in a 3D neutral atom array[1] AISHWARYA KUMAR, YANG WANG, TSUNG-YAO WU, DAVID WEISS, The Pennsylvania State University — We demonstrate a new approach to making targeted single qubit gates using Cesium atoms in a 5x5x5 3D neutral atom array. It combines targeted AC Zeeman phase shifts with global microwave pulses to produce arbitrary single qubit gates. Non-targeted atoms are left virtually untouched by the gates. We have addressed 48 sites, targeted individually, in a 40% full array. We have also performed Randomized Benchmarking to characterize the fidelity and crosstalk errors of this gate. These gates are highly insensitive to addressing beam imperfections and can be applied to other systems and geometries.

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