

Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Towards exciting a Rydberg gas in optical lattices.¹ MANUKUMARA MANJAPPA, JINGSHAN HAN, Graduate Student, RUIXIANG GUO, Post Doctoral Fellow, THIBAUT VOGT, Senior Post Doctoral Fellow, WENHUI LI, Principle Investigator, QUANTUM MATTER GROUP TEAM — Rydberg atoms are highly excited atoms with principal quantum number $n > 10$. They have exaggerated properties such as large dipole moment and high polarizability. Large dipole-dipole interactions between Rydberg atoms, which lead to Rydberg blockade and giant non linearity, provide unique opportunities for studying quantum many-body physics [1-3]. Rydberg excitation of ground state quantum gas in optical lattices has already shown the formation of spatially organized structures [2] and Rydberg dressed systems are promising for entering the strongly correlated regime [3]. Our current project is to study the collective excitation to Rydberg states from a quantum gas of ground state atoms in an optical lattice. In this poster we present the latest development in building up the experimental apparatus and our plans on spectroscopic measurements and spatially imaging of Rydberg excitations.

[1] Weimer, H., et al. (2010). Nature Physics 6(5): 382-388.

[2] Schausz, P., et al. (2012). Nature 491(7422) 87-91.

[3] Pupillo, G., et al. (2010). PRL 104(22) 223002.

¹Centre for Quantum Technologies, National University of Singapore.

Manukumara Manjappa
Graduate Student

Date submitted: 24 Jan 2013

Electronic form version 1.4