

# Towards Biphoton Generation for Hybrid Quantum Systems

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We are working towards the generation of narrow-band bi-photons through a four wave mixing process in cold samples of rubidium atoms created by a magneto-optical trap [1]. We are using a diamond configuration because in this scheme the alkali atoms have pairs of transitions decaying in rather different frequencies that can be readily separated to excite other atoms and be sent to a remote receiver [2]. Here we present the advances of our experimental machine: a working MOT, the fully stabilised laser system together with the control and data acquisition system. Our plan is to add control over phase correlations to the set of variables studied in the previous work towards generating heralded photons resonant with atomic gases for performing quantum information protocols [3].

## References

[1] A. Kuzmich et al., NATURE 423 6941 2003

[2] T. Chanelière et al., PRL 96, 093604 (2006)

[3] J.C Lee et al., PRL 117, 250501 (2016); V. Leong et al. NATURE COMM. 7:13716; S. Du et al. J. Opt. Soc. Am. 25 12 (2008)