Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **456** Type: **Oral (Non-Student) / Orale (non-étudiant(e))**

# Broadband quantum memory in a cavity via zero spectral dispersion

*Wednesday 9 June 2021 16:15 (4 minutes)*

We seek to design experimentally feasible broadband multiplexed optical quantum memory with near-term applications to telecom bands. Specifically, we devise dispersion compensation for an impedance-matched narrow-band quantum memory by exploiting Raman processes over two three-level atomic subensembles, one for memory and the other for dispersion compensation. Our proposed broadband quantum memory employs three-level atoms with atomic density, cavity quality, and Raman-laser power and detuning chosen such that inverse cavity lifetime equal so ptical depth, the delay-bandwidth product exceeds $10^6$, power efficiency exceeding 90% and at least one second of storage time, thereby leading to $10^6$ modes for multiplexing. Our design will lead to significant multiplexing enhancement for quantum repeaters to be used for telecom quantum networks.

**Primary author:** TASHCHILINA, Arina

**Co-authors:** Dr MOISEEV, Evgeny (Kazan Quantum Center); Prof. MOISEEV, Sergey (Kazan Quantum Center); SANDERS, Barry (University of Calgary)

**Presenter:** TASHCHILINA, Arina

**Session Classification:** W3-1 Quantum Information: Theory (DAMOPC) / Information quantique: théorie (DPAMPC)

**Track Classification:** Atomic, Molecular and Optical Physics, Canada / Physique atomique, moléculaire et photonique, Canada (DAMOPC-DPAMPC)