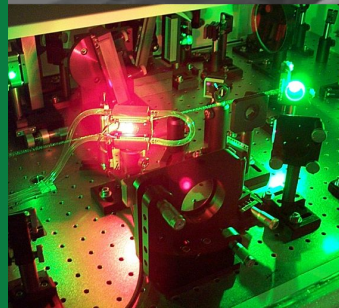
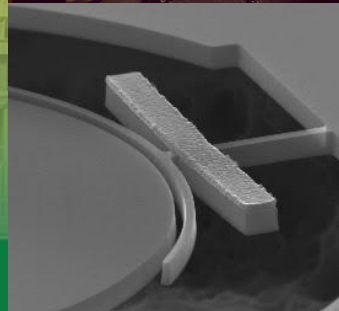
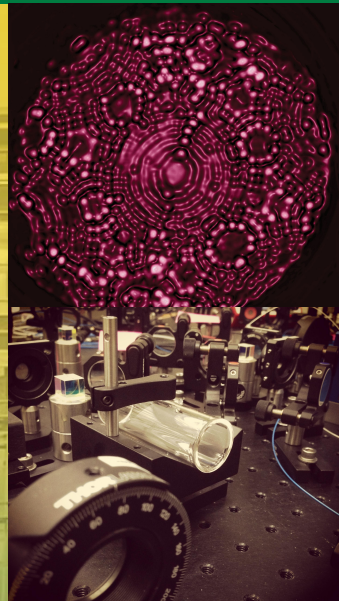


CONDENSED MATTER PHYSICS ATOMIC, MOLECULAR & OPTICAL PHYSICS



UALBERTA
PHYSICS

uncovering the nature of matter from the macroscale to the nanoscale

Researchers in Condensed Matter Physics and Atomic, Molecular & Optical Physics at the University of Alberta use advanced computational resources, state-of-the-art experimental facilities in CCIS and the nanoFAB explore a wide range of topics, including: magnetism, photonics, optomechanics, quantum technologies, scanning probe microscopy, strongly correlated electrons, superconductivity, superfluidity, topological phases of matter, ultracold quantum gases, ultrafast laser spectroscopy.

Igor Boettcher, Associate Professor, *Condensed Matter Theory*

The Boettcher group studies quantum many-body systems on a wide range of platforms, including topological semimetals, ultracold quantum gases, circuit quantum electrodynamics, and novel superconductors. This is achieved by applying techniques from quantum field theory and the renormalization group.

iboettch@ualberta.ca | sites.ualberta.ca/~iboettch/



John P. Davis, Professor *Cavity Optomechanics & Confined Superfluids*

Combining state-of-the-art nanofabrication, cavity optomechanics, and ultra-low temperatures, the Davis lab explores the interface between the classical world and the quantum one, while developing next-generation quantum technology. His lab has also developed Canada's only cryogenic system capable of cooling below 1 mK, in order to study exotic states of superfluid ^3He .

jdavis@ualberta.ca | www.ualberta.ca/~jdavis

Frank Hegmann, Professor *Ultrafast nanoscale quantum dynamics*

Dr. Hegmann explores ultrafast phenomena in materials on the nanoscale using time-resolved terahertz spectroscopy and terahertz scanning tunneling microscopy (THz-STM). His state-of-the-art Ultrafast Nanotools Lab and Ultrafast Spectroscopy Lab use amplified femtosecond laser sources and picosecond-duration terahertz pulses to probe ultrafast excitation dynamics and carrier transport in nanomaterials down to the atomic scale.

hegmann@ualberta.ca



Lindsay LeBlanc, Professor
Experimental Atomic and Optical Physics

Dr. LeBlanc uses atomic systems, including warm vapours, laser-cooled ensembles, and ultracold quantum gases (Bose-Einstein condensates) to study and exploit the quantum nature of matter. Applications include quantum memory, quantum computing, and sensing. This research has applications in quantum information and involves developing cutting-edge quantum technologies in her state-of-the-art lab.

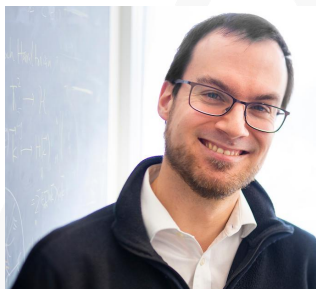
lindsay.leblanc@ualberta.ca |
sites.google.com/ualberta.ca/ultracold



Joseph Maciejko, Professor
Condensed Matter Theory

Dr. Maciejko researches emergent phenomena in quantum many-body systems. Areas of current interest include the topology and geometry of quantum matter, strongly correlated electrons, and quantum criticality.

maciejko@ualberta.ca | www.ualberta.ca/~maciejko



Frank Marsiglio, Professor
Condensed Matter Theory

The Marsiglio group studies various aspects of many-body electron systems, including superconductivity, polaronic effects, spin-orbit coupling in trapped ions, and impacts of external fields and stimuli.



Al Meldrum, Professor
Optics and Photonics

Dr. Meldrum's work focuses on optical materials development, applications-driven optical sensing technologies, and optical devices. His lab offers the opportunity for multidisciplinary training, with students interacting closely with chemists and engineers, as well as physicists and potentially industry as well.

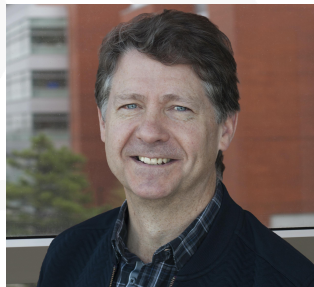
ameldrum@ualberta.ca | www.ualberta.ca/~ameldrum



Robert Wolkow, Professor
Atom-Defined Quantum Circuitry

Dr. Wolkow's research offers the opportunity to build, explore, and commercially deploy their lab's newly discovered quantum atom scale circuitry. Smaller, dramatically less energy consuming and enormously faster than CMOS, these atomic electric machines open the door to a near term classical computing revolution while pointing to a scalable approach to quantum circuitry.

rwolkow@ualberta.ca | www.robertwolkow.com



Additional researchers in CMP/AMOP include:

Massimo Boninsegni, Professor

massimob@ualberta.ca

<https://sites.google.com/site/mboninsegni>

Wayne Hiebert, Adjunct Professor

Wayne.Hiebert@nrc-cnrc.gc.ca

www.ualberta.ca/~whiebert

Gil Porat, Adjunct Professor

gporat@ualberta.ca

<https://www.ece.ualberta.ca/~gporat/>

Marek Malac, Adjunct Professor

mmalac@ualberta.ca

<http://tem-eels.ca>

Amina Hussein, Adjunct Professor

aehussei@ualberta.ca

<https://apps.ualberta.ca/directory/person/aehussei>



**UALBERTA
PHYSICS**

**CONDENSED MATTER PHYSICS |
ATOMIC, MOLECULAR & OPTICAL PHYSICS**

Office of Graduate Studies - Physics

physgradprogram@ualberta.ca

(780) 492-6219