

Dmitry K. Efimkin's research group

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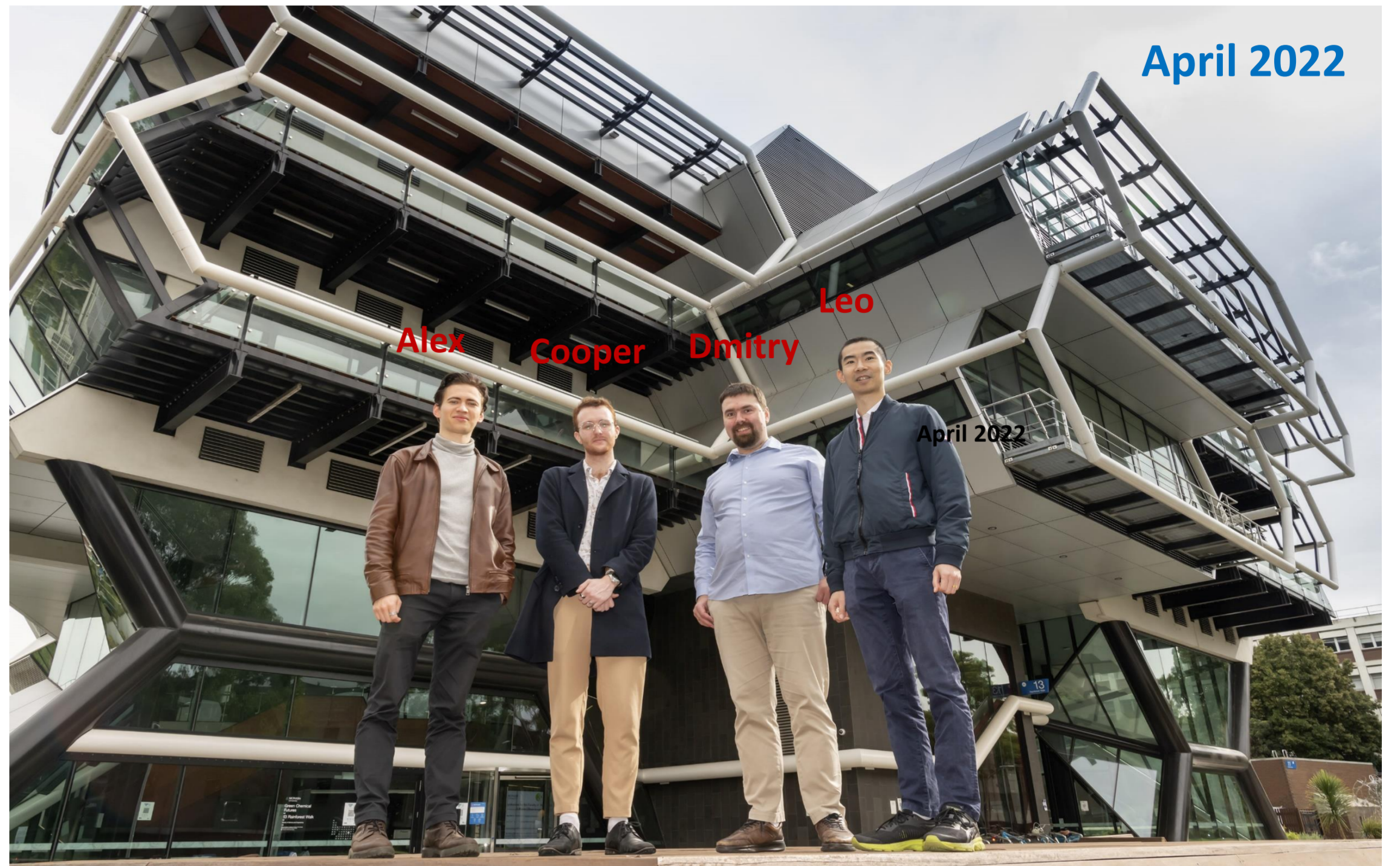


Condensed matter and
ultracold atomic gas
theory



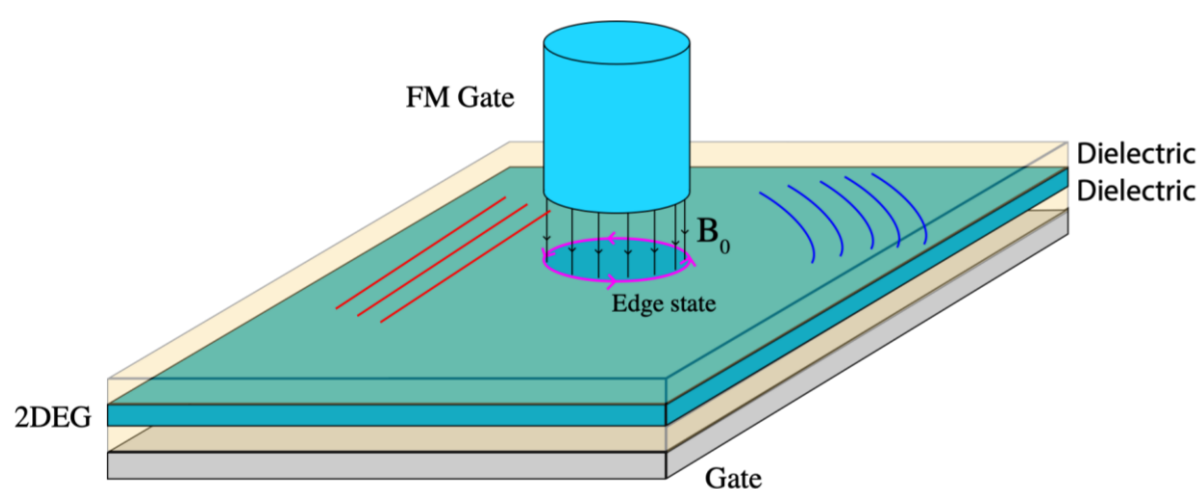
Novel and exotic
materials

<https://sites.google.com/a/monash.edu/dmitry-efimkin-research-group/>

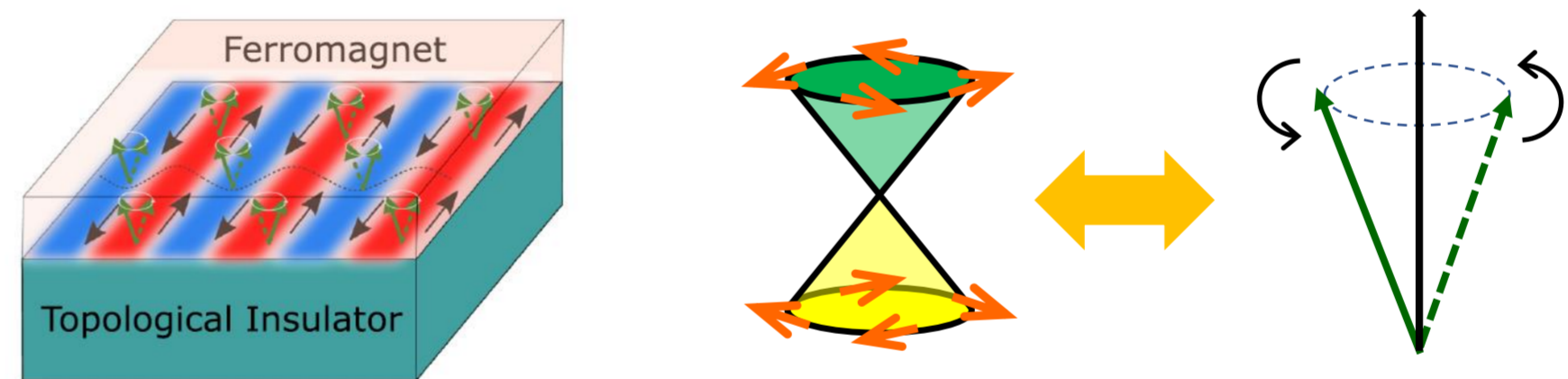


Questions we are have been recently interested in

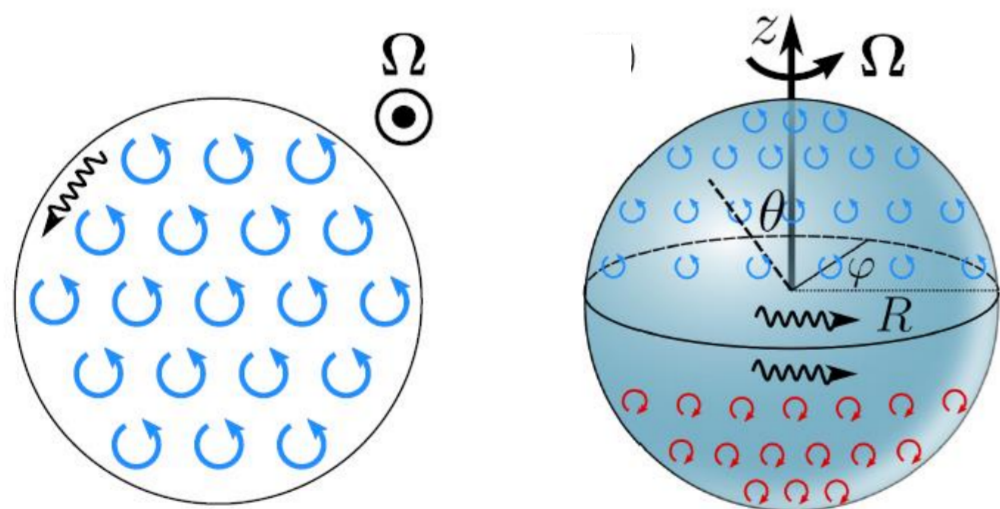
- Could you simulate Dirac electron scattering using plasma waves?



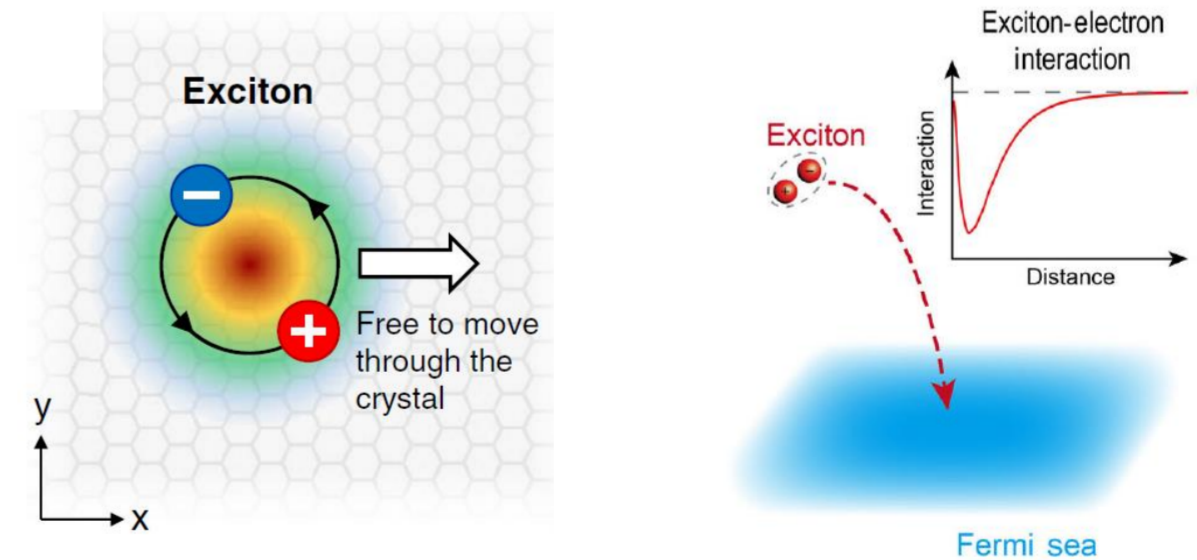
- What happens if you combine Dirac electrons and ferromagnet?



- What happens if you confine Bose-Einstein condensate in a spherical shell and rotate it?



- How to describe the optics of a semiconductor if it is doped and is not insulating anymore?



2023

Weyl excitations via helicon-phonon mixing in conducting materials – DKE and S. Syzranov – PRBL (accepted)

Topological hybrid electron-hole Cooper pairing - A. Chansky, DKE – PRB 108, 075433

Equatorial Waves in Rotating Bubble-Trapped Superfluids – G. Li and DKE – PRA 107, 023319

Quantum Dynamics of Attractive and Repulsive Polarons in a Doped MoSe2 Monolayer - D.

Huang et al – PRX 13, 011029

2022

Exciton-polaron interactions in monolayer WS2 – J.B. Muir et al. – Nature Commun. 13, 6164

Rydberg Exciton-Polaritons in a Magnetic Field – E. Laird, F.M. Marchetti, DKE, M.M. Parish, J.

Levinson – PRB 06, 125407

Equatorial magnetoplasma waves – C.Finnigan, M. Kargarian, DKE – PRB 105, 205426

2021

Hybrid dark excitons in monolayer MoS2 – H. Liu, A. Pau, DKE – PRB 104, 165411

Anomalous drag in electron-hole condensates with granulated order – H. Liu, A.H.

MacDonald, DKE – PRL 127, 166801

Topological fluctuating electron-hole Cooper pairs in graphene-GaAs heterostructures

– DKE – PRB 104, 245436

Topological spin-plasma waves – DKE, M. Kargarian – PRB 104, 075413

Electron-exciton interactions in the exciton-polaron problem – DKE, E. K. Laird, J.

Levinson, M. Parish, A. H. MacDonald – PRB 103, 075417