## ICSCE10

## **EXCITATIONS IN STRONGLY INTERACTING FERMI GASES**

Chris Vale1,\*, Carlos Kuhn1, Sascha Hoinka1, Paul Dyke1, Ivan Herrera1

<sup>1</sup>Centre for Quantum and Optical Sciences, ARC Centre of Excellence in Future Low-Energy Electronics Technologies, Swinburne University of Technology, Hawthorn VIC 3122, Australia \*e-mail: cvale@swin.edu.au

Dynamical processes in strongly-correlated quantum systems are central to understanding transport and dissipation. Here, we experimentally measure the excitation spectra of strongly interacting Fermi gases as a function of both the temperature and interactions. At temperatures below the superfluid transition, long wavelength excitations are dominated by the Bogoliubov-Anderson phonon mode whose frequency and width provide the sound speed and damping rate, respectively [1]. At higher energies, single particle excitations become accessible allowing a direct measurement of the pairing gap. Bragg spectra of gases at unitarity show a strong dependence on the temperature, particularly across the superfluid transition where the evolution of the phonon mode displays striking similarities to what is found in liquid helium [2]. In the high-momentum limit, studied of the excitation spectra reveal universal features, such as Tan's contact parameter which we have mapped across the superfluid transition [3]. These measurements establish quantitative benchmarks for many-body theories of fermionic matter.

## References

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