



Work plan: The project divides into in-house measurements (WP1), joint projects with partner groups (WP2) and crystal growth/discovery of new materials (WP3). Work carried out at project partners' laboratories is indicated in brown, studies at large facilities in purple, and work led by Cambridge scientists in blue. In detail, the work separates as follows:

WP1, in-house studies using cryomagnets and high pressure facilities in Cambridge:

O1) map out magnetic, superconducting and structural transitions, identify quantum phase transitions;

O2) survey non Fermi liquid properties in thermodynamic and transport measurements;

O3) quantum oscillation studies at $p = 0$ and high p on the Cambridge 20.4 Tesla cryomagnet;

WP2, collaborative projects, scheduled in consultation with partner laboratories and facilities:

O4) laboratory studies (heat capacity, thermal conductivity, penetration depth, NMR, tunnelling);

O5) facilities studies of magnetic and electronic excitations (neutron scattering, ARPES, high fields);

O6) theory and modelling with project partners at Univ. of Minnesota and colleagues in Cambridge carry on in parallel with experiments but respond to new results and inform the search for new materials.

WP3, crystal growth and materials discovery:

O7) provide superior crystals and systematically improve quality by studying the origins of disorder.

O8) search for new superconducting quantum materials in pressure-assisted high-throughput surveys guided by heuristic and computational filters (also WP 2).

Abbreviations: FMG = Grosche, MLS = Sutherland, GGL = Lonzarich, JC = Chen, PW = Worasaran, PLA = Alireza, PG1-4 = postgraduate students, MPI = project partners at MPI-CPfS Dresden, Minn. = project partners at Univ. of Minnesota, CP-BM = Cambridge collaborators Pickard and Monserrat.