The theory of Quantum Chromodynamics (QCD) is nowadays regarded as the most promising model to describe the phenomenology of particles and fields subject to strong interactions. Its mathematical regularisation by introducing a discretised spacetime known as lattice QCD (LQCD) and the so-called Wilson-twisted mass (Wtm) formulation in particular have proven a most flourishing approach resulting in an ever increasing consistency of theoretical predictions with experimental data in the field of meson and baryon masses as well as decay constants. However, explaining the phenomenology of strongly interacting matter at non-zero temperature has remained a challenging task due to both the required high statistics and the quest for simulations close to the real physical situation.

During its recent activities the tmfT collaboration has investigated the applicability of Wilson-twisted mass LQCD in the field of large scale finite temperature simulations and numerically characterised the model's phase structure at finite temperature. The accumulated expertise of the tmfT collaboration together with progress of the ETM collaboration in two and four flavour Wtm LQCD now paves the way for a systematic study of the thermodynamic properties of QCD on the lattice and the extrapolation of its results to continuum physics. On the basis of this agenda the applicants hope for a substantial contribution to this still multifariously discussed field of research.