

**Recommendations from the 1st WG1 meeting,
particularly specifying most urgent problems in area of static properties of hot strongly
interacting matter.**

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The main goal of the first meeting of Working Group 1 was to compare and contrast the different theoretical approaches that are available to analyse the properties of strongly interacting matter in equilibrium, both in the hadronic gas and in the quark-gluon plasma. These methods include lattice QCD, effective models, the hadron resonance gas and holography. While all of these approaches are being used, there is not always sufficient cross-talk between the practitioners. Moreover, the physics input and understanding of pending questions can be quite distinct. For instance, in lattice QCD the emphasis is on high-quality data and the extraction of basic quantities, such as hadronic masses in the low-temperature phase and indications of melting of hadrons in the high-temperature phase. In the hadron resonance gas model on the other hand, the physics input is taken from concepts that arise in nuclear physics, such as attractive and repulsive channels, phase shifts, and excluded volumes. These concepts are not easily accessible on the lattice. Holographic methods can provide qualitative insights on the behavior of strongly interacting matter in theories that are similar to QCD and hence yield an important tool to explore new phenomena, focusing on universal features. These phenomena can then be further investigated using effective models or simulations of lattice QCD, in order to arrive at quantitative understanding.

- The first recommendation that emerged from the first WG1 meeting is to establish closer contacts between the various research activities and encourage a close and critical comparison of input, methods and results, with the aim of formulating a description of hot matter which incorporates insight from lattice QCD, effective theories, nuclear physics and holography. This can be achieved by bringing together researchers at workshops where dedicated time is devoted to discussion, to stimulate understanding and exchange of ideas (such as at the first WG1 meeting).
- A second recommendation is to compare the physics predictions quantitatively, and highlight any discrepancies, with the aim of removing those by more advanced descriptions. Again, sufficient discussion and collaboration time should be devoted to this.