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Editorial

Theory of hot matter and relativistic heavy-ion collisions (THOR)

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This topical issue summarises some of the results realised thanks to the COST Action CA15213, which was running under the acronym THOR—short for *Theory of hot matter and relativistic heavy-ion collisions*—from November 2016 until April 2021.

Interesting progress has been made in explorations of hot, strongly-interacting matter with the help of heavy-ion collisions. Very precise high-statistics data furnished by experiments at the Large Hadron Collider at CERN and the Relativistic Heavy Ion Collider at Brookhaven National Laboratory, as well as a few smaller experiments, have definitely brought the field into the precision era. As a result, modern ideas need to be practically implemented in computable models and ultimately compared to data, with theoretical projects and results at all levels being vitally interconnected. From formal concepts based on underlying microscopic theories up to models aimed at simulations of real collision events and their outputs, outcomes at one level are applied at another and stimulate improvements there. For this reason, THOR worked very inclusively and supported a very broad range of theoretical projects that were connected with the exploration of hot and dense strongly-interacting matter.

The activities were organised within three Working Groups:

– WG1: Phases of strongly interacting matter;
– WG2: Dynamics of strongly interacting matter;
– WG3: Initial state and hard probes.

Even these Working Groups were deliberately formed in a rather broad manner in order to facilitate an exchange of ideas which would result from technically different approaches to solve the same problem.

After more than four years of running, 301 people participated in some way in THOR activities. Most of them were students at the Training Schools. THOR put a strong emphasis on the training of the future generation of experts and organised five schools in total. In addition, seven Scientific Meetings brought together scientists from one or more Working Groups and initiated new developments.

The most important activities, however, were the numerous Short Term Scientific Missions. THOR supported 73 such research visits. The papers collected in this issue of the European Physical Journal A are results that either came directly out of such collaboration or were crucially initiated by a THOR activity.

We would like to use this opportunity to express our gratitude to the COST Association—*European Collaboration in Science and Technology*—for the important support that helped to achieve a better understanding of hot and dense QCD matter. We are grateful for the welcoming and friendly support from our Science Officer, Dr. Fatima Bouchama, and from the Administrative Officers Cassia Azevedo and Milena

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Gert Aarts, Jörg Aichelin, Marcus Bleicher, Elena Ferreiro, Laura Tolos, and Boris Tomášik Guest editors

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