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New models and hydrocodes for shock wave processes in condensed matter
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This conference was devoted to discussions about the development of new fundamental models or methods and new experimental set-up in the field of shock waves physics, and their implementation in hydrocodes. Two main topics have been tackled. The first one is the propagation of shock waves in metals and the modelling or observation of the subsequent processes like elastic-plastic transformations and damaging. The second one concerns the behaviours of explosives under shock and the determination of properties like unreacted or detonation products equations of state, chemistry and thermodynamic properties of the reaction zone, etc.

For two decades we observe a tremendous growth of the computers capabilities which can be mainly attribute to the advent of the massively parallel machines. For this reason many numerical and theoretical methods which were only used in fundamental research laboratories became indispensable for the determination of data available in industrial processes. It is the case of *ab initio* methods which are now widely used for the determination of equations of state of metals under high pressures or explosives under shock. An other example is the microscopic but classical methods like molecular dynamics (MD) or Monte Carlo (MC) which can take into account up to a few billons atoms: Note that such samples are at the macroscopic scale and correspond for example to an hydrodynamics mesh. Of course these methods don't substitute for the macroscopic methods (finite elements, thermo-chemistry, and so one) but can be used to validate theoretical hypotheses and to determine parameters of models in realistic situations.

At the same times the progresses in experimental technologies permit observations more and more time and spatial resolved. Time resolved spectroscopy, protonography, X-ray synchrotron beams and various optical measurements lead to a detailed knowledge of strong dynamical processes. One the more interesting consequence is the overlapping of experiment and microscopic calculation scales, permitting the direct atomistic simulations of experiments. So multi-scale physics is undeniably one of the keys of progress in shock wave studies and the organizers wished that all the spatial and temporal scales be equally represented, emphasizing the bridges between the various scales.