The surface of a crystal, apart from acting as a defect for phase transitions of the bulk, is also the site for interesting two - dimensional phase - transition - like phenomena including order-disorder transitions (melting) of adsorbate films, surface segregation and related ordering effects, reconstruction of semiconductor surfaces, surface magnetism, etc. Two combined sessions of the Phase Transitions Symposium and the Surface Physics Symposium, with a number of invited talks, will be devoted to this important topic.

New and exciting developments are taking place in the area of phase-transition-like phenomena in systems far from thermo-dynamic equilibrium. Lasers, hydrodynamic flows, current flows in semiconductors, chemical reactions, all exhibit instabilities with bifurcation into new phases of broken symmetry. Breaking of time translation symmetry leads to dynamical structures such as oscillatory states or solitary travelling-wave states. A highly important discovery is the possibility of bifurcation into strongly non-periodic states with pseudo-ergodic properties, which is expected to lead to an improved understanding of turbulence. Some aspects of this area will be reviewed in two invited lectures on hydrodynamic instabilities.

H. Thomas

Symposium C 2: Hot Plasma in Space and Laboratory

The physics of hot plasma has been growing at an appreciable rate during the last decades, due to the challenge of both its possible application in energy generation through thermonuclear fusion and the role it plays in space and astrophysics. It is a consequence of this growth that specialization has become considerable. Even for a plasma physicist it becomes increasingly difficult to keep up with the rapid development in the different fields, and there are not many opportunities to overcome the barriers of specialization, The Symposium on Hot Plasma in Space and Laboratory has been conceived to offer just such an opportunity. It is intended to give an overview, accessible also to non-specialists, over a number of selected topics in which relevant progress has been made during the past years. At the same time, an attempt will be made to characterize and display the place plasma physics has in the frame of physics as a whole: plasma physics is concerned with the description of the behaviour of a large number of charged particles interacting with each other. The great richness in phenomena appearing in plasmas and at the same time the difficulties and the appeal of the discipline are directly due to this fact.

Taking this viewpoint, it is evident that putting the accent of the Symposium on collective phenomena in hot plasmas is rather a way of presentation than a selection criterion. As far as laboratory plasmas are concerned, some aspects of three very different types of plasma of thermonuclear interest will be examined, namely: magnetically confined toroidal plasmas; plasmas generated by intense laser light beams impinging on matter; plasmas produced in a magnetic field by relativistic electron beams. These three topics offer an opportunity to show how important collective effects are, both in plasma formation and heating, and in imposing limitations on the existence of certain plasma states, due to the appearance of gross instabilities or to transport induced by turbulence. In many cases heating and transport phenomena can, in fact, be visualized as a consequence of plasma particles interacting with wave fields which are self-consistently generated in the plasma. Effects of this same kind are also responsible for most of the energy transfer phenomena appearing in astrophysical plasmas, and some examples of this kind will be discussed at the Symposium too. On the order hand, it is gross instability and again turbulence-induced transport effects determining essential limitations on plasma confinement, which impose important constraints on the way to utilizing plasmas in energy production by fusion of light nuclei.

Somewhat apart from these questions, examples of recent important developments in plasma diagnostics will be presented at the Symposium. Here again, the leitmotiv of the Symposium becomes apparent as plasma diagnostics is largely concerned with making evident, collective phenomena.

F. Engelmann

Symposium C 1:

For the purpose of this short introduction to the C1 Symposium, Nuclear Astrophysics may be defined as that peculiar marriage of physics and astronomy which seeks to explain how, why, when, where and in what quantity the elements and their isotopes were produced and are being produced today. These may seem to be extraordinarily ambitious questions for such a young science to answer and, in all their details, they are. However, today we do have a firm basis of observational evidence supplied by the solar system, cosmic rays, gas clouds, stars and distant galaxies; experimental data obtained from laboratories across the world concerning reaction cross sections and the like; and the theoretical knowledge (sometimes) to put it all together in a coherent form so that we do have some confidence in the general picture that is emerging and which we hope to see coloured-in more during our symposium.

Some of the most profound statements modern science makes about the Universe are embodied in the words "Hot Big Bang". The success of the simplest cosmological model of the Hot Big Bang, based on the observed highly isotropic 2.9K microwave background radiation and the density of visible matter in the Universe, in accounting for the observed overall level of the hydrogen and helium abundance and of their isotopes, is remarkable and is widely

Symposium D:

The investigation of interactions between heavy particles i.e. atoms and complex nuclei is an exciting field of physics that has been steadily growing during the past few years. A wide range of new physical phenomena and submicroscopic behaviour has been discovered. It is the goal of this Symposium to present in a selection of review talks first results on nuclear, atomic and solid state physics.

Many projects have burgeoned in European laboratories that operate tandem Van de Graaff accelerators, the first accelerators for heavy ions. One of the leading heavy ion laboratories has been established at the Joint Institute for Nuclear Research at Dubna, from where a large number of