Magnetism and Activity of the Sun and Stars
J. Arnaud and N. Meunier (eds)
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Foreword

Magnetic fields play a major role in astrophysics, particularly considering the atmospheres of the Sun and stars. They create solar and stellar activities, heat outer atmospheres, accelerate winds. The generation of these fields, the way they produce activity cycles, accelerate and heat plasmas is far from being understood. More generally, magnetic fields are found to influence, sometimes drastically, a large number of physical processes (and in particular transport processes) and are therefore expected to have an important impact during various phases of stellar evolution, and in particular during star formation. In presence of magnetic fields, Zeeman effect polarizes spectral lines. Weak magnetic fields can be diagnosed using the Hanle effect. Spectropolarimetry is the technique of choice to access magnetic fields in stellar and solar atmospheres. The Sun is the only star that offers the potential of studying magnetic activity in great detail. The French-Italian solar telescope THEMIS has been built for such investigations. New-generation spectropolarimeters, like ESPADONS at CFHT and NARVAL at TBL will soon give access to surface magnetism with some spatial resolution, for much fainter stars, so for many more objects, than was previously possible.

The synergy between studies on the Sun and stars of different types is very important to improve our understanding of generation and role of magnetic fields. For this reason the PNPS and PNST (french national programs on stellar and solar-terrestrial physics, funded by CNRS) supported the idea of a meeting bringing together astrophysicists studying solar and stellar magnetic fields and activity.

The workshop was held at Observatoire Midi-Pyrénées, in Toulouse on September 17-21, 2002 and was attended by 61 scientists. It was organized in the following sessions: origin and impact of stellar magnetic fields; measuring magnetic fields; solar and stellar magnetism: from photospheres to coronae; stellar magnetism: young stars and circumstellar environment. The proceedings follow this thematic structure.

The meeting was dedicated to Jean-Louis Leroy who made important contributions to the development and exploitation of polarimetry for solar and stellar magnetism studies, on the occasion of his retirement. Jean-Louis did most of his observations at Pic du Midi Observatory and September 22 was devoted to a visit of this beautiful place.

J. Arnaud
N. Meunier

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