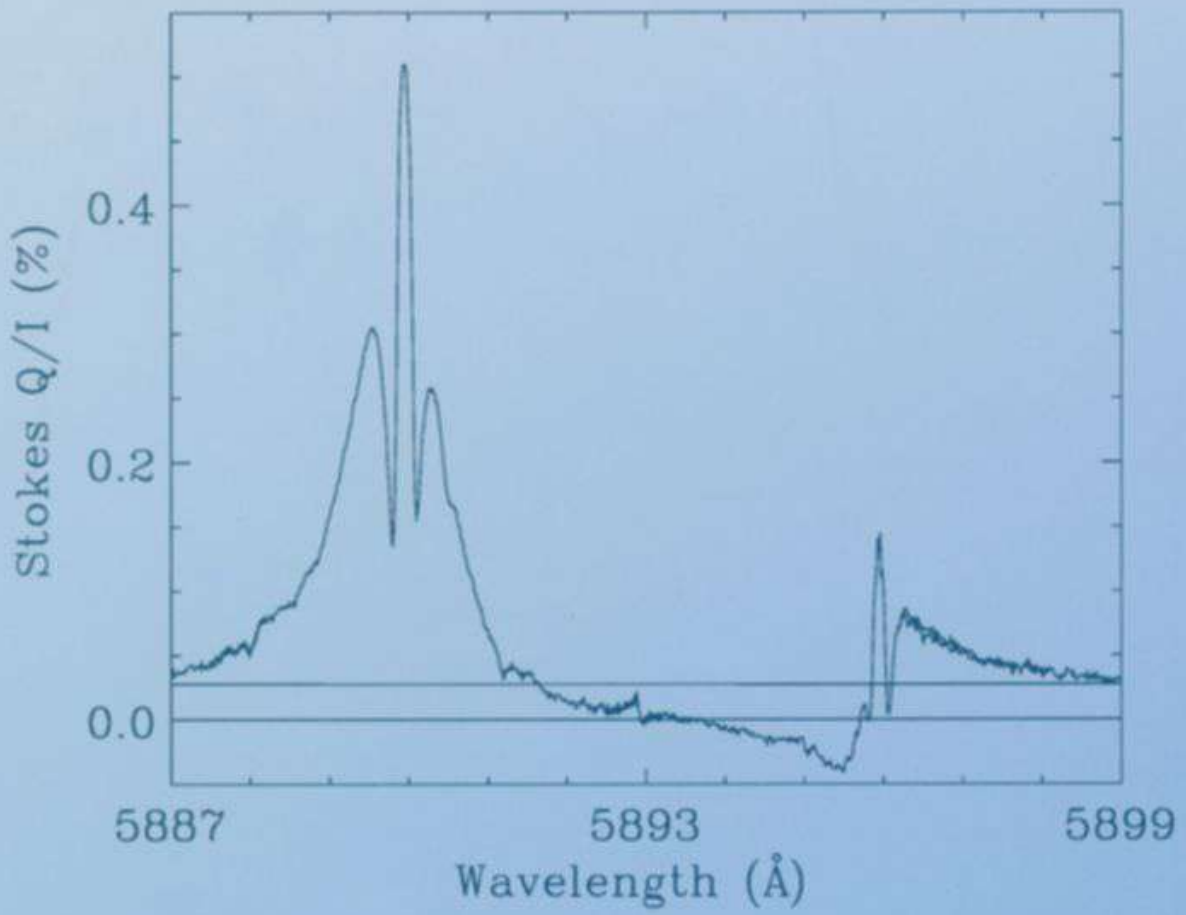
Solar Polarization

Edited by

J. O. Stenflo and K. N. Nagendra



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Proceedings of an International Workshop held in St. Petersburg, Russia, 8–12 May, 1995

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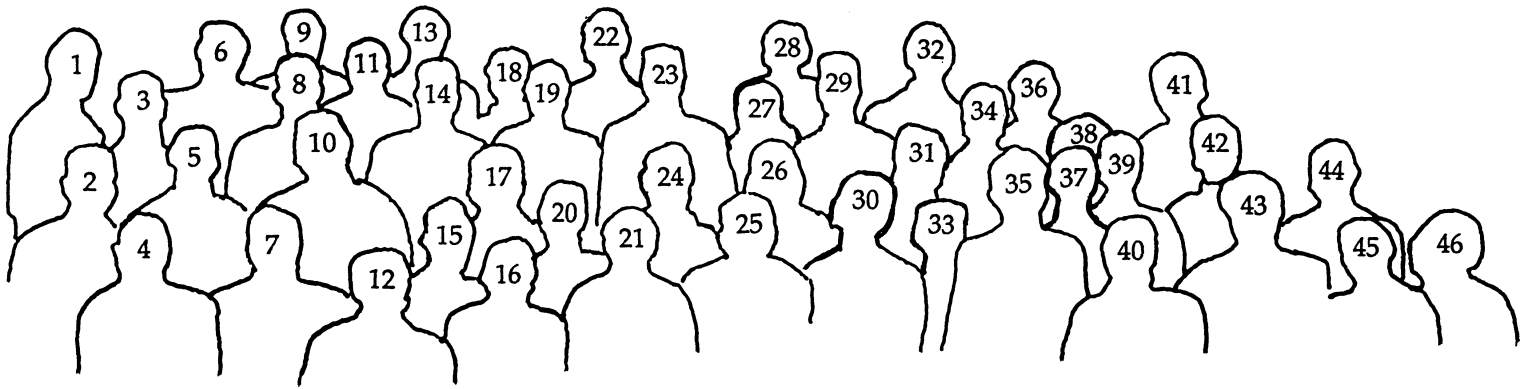

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PREFACE

Much progress has been made in recent years in understanding the complex physics of polarized radiation in the sun and stars. This physics includes vector radiative transfer and spectral line formation in the presence of magnetic fields, scattering theory and coherence effects, partial redistribution and turbulent magnetic fields, numerical techniques and Stokes inversion, as well as concepts for polarimetric imaging with a precision only limited by photon statistics. Since these various aspects have in the past often been dealt with in a fragmented way, there was a great need to organize an international conference that could address the whole problem area in a comprehensive way. With this aim an international Workshop on *Solar Polarization* took place in St. Petersburg 8-12 May 1995. The workshop format had the advantage of allowing the participants to penetrate the various topics in greater depth, and the venue in St. Petersburg was chosen to stimulate closer collaboration between Russia and western countries.

There is a long and outstanding tradition in Russia in the theory of radiative transfer. The next logical step for this theory is to move from scalar problems to "vector transfer", i.e., to the transfer of polarized radiation. During a visit to Nice in 1993 our host there, Helène Frisch, and the visitors Seva Ivanov (St. Petersburg) and Jan Stenflo (Zurich), decided to form a "troika" who would organize an international Workshop in St. Petersburg on the topic "Solar Polarization". With this topic the area of vector radiative transfer gets embedded in a broader context that includes all the various magnetic field effects and diagnostic problems that are so central to contemporary solar physics. The various theoretical and experimental results for the "solar laboratory" also serve as benchmarks for the rest of astrophysics.

48 participants from 12 countries attended the Workshop. The Central Astronomical Observatory at Pulkovo kindly hosted the conference. We are grateful to the Observatory Director, Dr. V.K. Abalakin, and the Vice Director, Dr. Yu.N. Gnedin (who both served as Co-Chairmen of the Local Organizing Committee) for the marvellous hospitality shown to us. However, the key role among our Russian

hosts who made the conference such a success was played by Prof. V.V. Ivanov, who from the very start was our main contact person for all matters concerning the Workshop. The other members of the Local Organizing Committee were S.F. Elesin, Yu.A. Nagovitzin, V.S. Popov, and O.A. Tsiopa. To all of them we wish to express our sincere thanks.

All the foreign participants were accomodated in the Guest House of the Pulkovo Observatory, where a specially brought in kitchen staff was serving us meals of outstanding quality and catering to all our wishes. The very extensive social program for the participants and for the accompanying persons made the week in St. Petersburg particularly memorable. The high point was our participation in the celebration of the end of World War II on May 9. A number of small boats had been rented, which took the Workshop participants along the canals of this beautiful city, such that we emerged at 9 pm on the river Neva right in front of the Winter Palace among the battle ships and submarines when the canon salutes and fireworks started.

According to the new rules of SOLAR PHYSICS for the publication of proceedings from a scientific conference, all papers to be published have to go through a regular refereeing process, and pure reviews should be avoided, since all contributions have to deal with new results. We are grateful for the hard and thorough work done by all our referees, who made it possible for us to produce a high-quality volume on "Solar Polarization" in a short time. The new rules of SOLAR PHYSICS also stipulate that a member of the Editorial Board of the journal may serve as a Guest Editor for the proceedings, and that a Proceedings Organizer has to be nominated. One of the chief editors of SOLAR PHYSICS is designated as a Supervisor for the proceedings. In our case the Supervisor is C. de Jager, the Guest Editor J.O. Stenflo, and the Organizer K.N. Nagendra.

Much of Nagendra's work on the proceedings was carried out while he spent an extended visiting period at Observatoire de la Côte d'Azur in Nice, following the Workshop. We are grateful to the Observatory in Nice for supporting this extensive work with its infrastructure. Our special thanks go to Helène Frisch for her crucial and dedicated support as a member of the "troika" for the Workshop, and for organizing the support from Nice for work on the proceedings.

The following served as Chairpersons for the various scientific sessions: M. Faurobert-Scholl, H. Frisch, V.V. Ivanov, J. Sánchez-Almeida, E. Landi Degl'Innocenti, D.E. Rees, S.K. Solanki, and J.O. Stenflo. During much of the last day the Workshop split up in

two separate groups for in-depth discussions on two main topics of the meeting, namely "Scattering Physics" (group leader: J.O. Stenflo) and "Magnetic Field Diagnostics" (group leader: S.K. Solanki), which was followed by a concluding, summarizing discussion with both groups together.

Finally we wish to thank all the participants of the conference. Thanks to their important oral and written scientific contributions and the lively discussions they generated we could achieve the objectives set for this successful Workshop.

Zurich and Bangalore *J.O. Stenflo*
October 1995 *K.N. Nagendra*