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ESS Science Symposium on Neutron Particle Physics at Long Pulse Spallation Sources,  
NPPatLPS 2013

## Preface

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Experiments in particle physics with neutrons are notoriously limited by statistics. The European Spallation Source (ESS) will be the first pulsed neutron source that equals today's most intense neutron source, the High-Flux Reactor of the Institut Laue Langevin, in time-averaged flux. It will therefore provide new opportunities for particle physics with neutrons: Experiments using pulsed beams at continuous sources already will be boosted in statistics, and, for all experiments, wavelength information and time structure in the beam are available without loss of statistics. This will enable much cleaner systematics for many experiments. But also other properties of the ESS may be profitable for particle physics, for example a possibly larger freedom for neutron extraction from the moderator or simply the fact that requirements of future users can still be accounted for. Therefore it was high time to discuss how particle physics with slow neutrons can best profit from these opportunities and to identify the needs of particle physics experiments at the ESS.

The ESS Science Symposium on Neutron Particle Physics at Long Pulse Spallation Sources took place at the Laboratoire de Physique Subatomique et de Cosmologie in Grenoble, France, from 25 March to 27 March 2013.

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Compared to the previous 3N3MP workshop in Lund [1], the discussions were focused on neutron physics. For an efficient discussion, the number of participants was limited to 50. The central topics were:

- Scientific case for neutrons in particle physics in 10 years from now,
- Concepts and needs for instrumentation, including different possibilities of ultracold neutron sources at the ESS.

The six invited and more than 20 contributed talks as well as the plenary discussion clearly demonstrated that particle physics with slow neutrons will continue contributing to our understanding of nature and that the scientific community is eager to make best use of the ESS.

### International Advisory Committee

- Hartmut Abele, TU Wien
- Geoffrey L. Greene, University of Tennessee and SNS
- Klaus Kirch, ETH Zürich and PSI
- Hirohiko M. Shimizu, University of Nagoya and KEK

### Local Organising Committee

- Peter Geltenbort, ILL
- Guillaume Pignol, LPSC
- Jocelyne Riffault, LPSC (workshop secretary)
- Angelika Taffut, ILL (workshop secretary)
- Torsten Soldner, ILL (chair)

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### References

- [1] Workshop on Neutrino, Neutron, Nuclear, Medical and Muon Physics at ESS, Lund, Sweden, December 2-4, 2009. Proceedings available at: <http://www.hep.lu.se/staff/christiansen/proceeding.pdf>