The Walter Hälg Prize Committee

of the European Neutron Scattering Association

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Prof. Dr. Max. Einhaeupl
President Wissenschafsrat
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30 October 2002

Dear Prof. Dr. Einhaeupl

The Wissenschafsrat Evaluation of the European Spallation Source Project

The Committee of the Walter Hälg Prize of the European Neutron Scattering Association understands that the full scientific and technical case for the European Spallation Source project has recently been submitted to the Wissenschafsrat for reconsideration. We, the ENSA Hälg Prize Committee, applaud and support this initiative. It constitutes a first essential step towards securing the high-power neutron source which Europe needs in order to maintain and bolster its internationally acknowledged leading position in neutron research and the multidisciplinary condensed matter science and technology base that this neutron research underpins.

However, in order to ensure that the impending reconsideration of the European Spallation Source project is suitably studied and balanced, we feel that it is first necessary to correct several misleading and unsubstantiated comments regarding neutron science in general that were aired in the *Statement on nine large-scale facilities for basic scientific research and on the development of investment planning for large-scale facilities* published by the Wissenschafsrat on 12 July 2002.

Our first concern is that in the WR report it is stated that:

"*the sub-panel did not come to a conclusion as to whether the scientific issues arising from the aforementioned application fields of neutron research, which are the object of the proposed ESS scientific programme, will still be topical enough and will justify the need for a new generation neutron source at the time when the ESS is realistically expected to go into operation* [ie in 10 year's time]*".*

The ENSA Hälg Prize Committee wishes to emphasise that for the last half century neutrons have played a crucially important role in developing and refining our understanding of many key scientifically important and technologically significant aspects of condensed matter across the disciplines of physics, chemistry, materials, and the life, earth and engineering sciences. These disciplines and their associated fields of scientific and technological endeavour will undoubtedly remain "topical" well beyond the end of the next decade. Correspondingly there is no doubt that neutron research will continue to make a major, and indeed growing, contribution to each of these fields. Moreover, neutron scattering is a uniquely powerful and ubiquitous tool that continues to rise to the most exacting challenges set by condensed matter research and development. Thus, to suggest that there may be insufficient justification for a new generation neutron source in ten years time is to imply that physics, chemistry, materials, and the life, earth and engineering sciences will soon cease to provide any new intellectual challenges in condensed matter research.

Secondly, we find the statement

"*In the case of a new investment on this financial scale, the priority must be to open up new research areas for neutron scattering rather than to develop neutron sources solely on the basis of foreseeable technological limitations of the neutron sources currently operated in Germany and elsewhere in Europe (so-called "neutron gap")"*

to be unjustified and erroneous.

As already indicated above, neutron science is a tool of exceptional significance in all disciplines concerned with the structure and dynamics of condensed matter. Existing neutron facilities have a proven record of opening their doors to developing research areas associated with each of these disciplines. Precisely because of this broad experience the neutron user community and the providers of neutron beams are fully aware of the current limitations for full exploitation of the neutron technique. Only by transcending these "*foreseeable technological limitations"* will current intensity and resolution thresholds be crossed, thereby opening up entirely "*new research areas*". In fact history clearly shows that technical advances in neutron sources have always led to the opening of new research areas.

Finally, the Wissenschafsrat report suggests that

"there should be greater acknowledgement of the alternative and complementary developments in the field of synchrotron radiation and of alternative laboratory methods of structural research such as microscopy, optical spectroscopy, NMR or computer simulation"

whilst

"*the Science Council considers it necessary to link the identification of neutron requirements closely with the examination of alternative and complementary (laboratory) methods in the field of structural research. For example, synchrotron radiation, microscopy, optical spectroscopy, NMR and computer simulation provide techniques which, in the case of some of the ESS-related research issues, could provide comparable results while requiring less equipment and lower investment costs*"

Neutron scattering has acquired a unique role in condensed matter science and technology because the properties of the neutron enable it to probe regions of parameter space defined by spatial and temporal coordinates that cannot be accessed by any other experimental techniques. Indeed, even with major developments in all related experimental techniques there will be very little encroachment upon the regions of parameter space traditionally covered by neutron methods. By definition this ensures that the neutron will continue to fulfil a vital role that is at once unique and complementary. It is entirely erroneous to suggest that any other technique "*could provide comparable results*": where any overlap exists the arguments of complementarity are enforced and vindicated rather than negated.

Because the role of the neutron is unique yet complementary, investment in neutron sources should be considered as justifiable strategic investment. Indeed the cost of neutron research is entirely in line with comparable research using complementary techniques. This point is adequately illustrated by reference to *"The Evaluation of Scientific Research: Selected Experiences"* published by the OECD (GD(97)194) in which the G7 (German) average number of papers per 1M Euro of government civil funding is 6(5.4), while a recent estimate for Europe's only fully international neutron user facility, the Institut Laue Langevin gives 6 papers per 1M Euro.

At a time when the Japanese and American governments have made major financial commitments to next generation neutron sources designed to serve user communities each less than 10% the size of that in Europe, and as the American government is already looking beyond its own new spallation source for yet more investment in neutron science infrastructure, we urge the Wissenschafsrat to recognise the crucial role played by neutron scattering in sustaining and advancing condensed matter science and technology in Europe, and to assess the importance of the ESS project in this context.

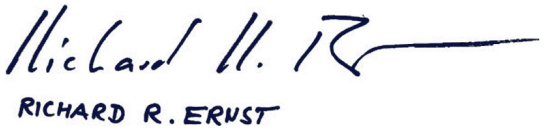
We hope that the above comments provided by the broadly multidisciplinary and internationally recognised ENSA Hälg Prize Committee will prove useful in the forthcoming deliberations on the ESS project.

We thank you for considering our comments

Yours sincerely

Professor Robert Cywinski (Chairman)

for and on behalf of the undersigned ENSA Hälg Prize Committee Members



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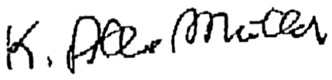

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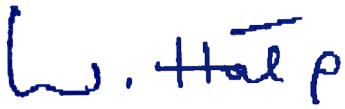

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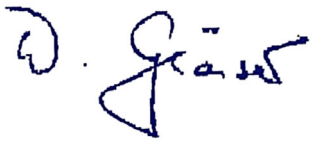

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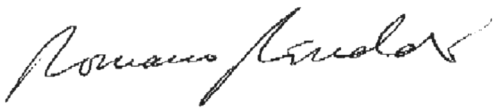

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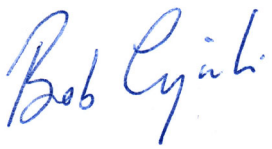

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