

20/02

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## German Science Council releases a statement on nine large-scale facilities for basic scientific research

In autumn 2000, the Federal Ministry of Education and Research requested the Science Council to submit expert assessments and science policy appraisals of nine large-scale facilities proposed by institutions of the *Helmholtz-Gemeinschaft Deutscher Forschungszentren* (HGF), the *Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz* (WGL) and the Max Planck Society (MPG), partly in collaboration with universities and European and overseas partners. The projects for the facilities span broad areas of physics, the material sciences, environmental and geo-science research as well as fields of life science.

A working group established by the Science Council arranged for the expert assessments of the individual projects to be carried out by several sub-panels. In addition to members of the Science Council, 53 external specialists, of which 36 came from abroad, were involved in producing the individual assessments. On the basis of the findings of each sub-panel, the Science Council has placed the proposals for each individual facility in the context of the national and international development of the research fields concerned and considered their overall importance in terms of science policy. As a result, the projects have been divided into three different categories:

The **facilities in the first group**, which, when implemented, will provide research infrastructures of a new quality, will contribute significantly to the development of the field of research concerned and are expected to lead to new scientific knowledge, are considered by the Science Council to **merit unconditional support**. Convincing scientific programmes and technical design reports have been presented for these projects. This first group includes the following facilities:

- **High Field Laboratory Dresden (HLD)**, proposed by the *Forschungszentrum Rossendorf* (FZR) and the *Institut für Festkörper- für Werkstofforschung Dresden* (IFW). The investment costs total Euro 25 million. The planned laboratory for long pulsed, extremely high magnetic fields of up to 100 Tesla allows completely new experiments to be conducted in condensed matter physics and the material sciences.
- **High Altitude and Long Range Research Aircraft (HALO)**, proposed by the *Deutsches Zentrum für Luft- und Raumfahrt* (DLR - German Aerospace Centre) and

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The Science Council advises the Federal Government and the *Länder* governments on questions concerning the structural and programme-related development of higher education institutions, science and the research sector and concerning the construction of new universities.

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the Max Planck Society (MPG). The investment costs total Euro 97 million. HALO offers enhanced capabilities compared to the current research aircraft and is expected to contribute significantly to international research on global change as well as to geo-physical research.

In the case of the **second group of facilities**, which, when implemented, will also provide research infrastructures of a new quality, there are certain questions which still require clarification. For this reason, the Science Council feels this group of facilities **can be supported when certain conditions have been fulfilled**. The Science Council requests the Federal Government to submit the project proposals again subsequent to revision in accordance with the requirements. This group includes the following facilities:

- **TeV-Energy Superconducting Linear Accelerator (TESLA)**, which under the supervision of the *Deutsches Elektronen-Synchrotron* (DESY) is being planned as a global cooperation project. The investment costs total Euro 3.45 billion. TESLA will provide answers to fundamentally important questions in elementary particle physics and cosmology.
- **TESLA X-ray Free Electron Laser (TESLA X-FEL)**, proposed as part of the international TESLA project supervised by DESY. According to the current plans, the investment costs for the X-FEL amount to Euro 673 million. Owing to the high luminosity and time resolution of the X-FEL, a completely new quality of experiments can be expected for many areas of research in the natural, life, geo- and material sciences.
- **International Accelerator Facility for Beams of Ions and Antiprotons**, proposed by the *Gesellschaft für Schwerionenforschung* in Darmstadt (GSI). The investment costs total Euro 675 million. The proposed facility opens up new avenues in basic and applied research, above all in the fields of nuclear, hadron, atomic and plasma physics.

For the **third group of facilities**, the Science Council is submitting **specific statements** for various reasons. Should continuation of the work on the scientific programme and on the technical design report for these facilities lead to further knowledge and to a new project proposal, it will be necessary to carry out a new assessment. This group includes the following facilities:

- Soft X-ray Free Electron Laser (Soft X-ray-FEL), proposed by the *Berliner Elektronenspeicherring-Gesellschaft für Synchrotronstrahlung mbH* (BESSY).
- European Spallation Source (ESS), planned as part of a European cooperation project with the participation of the *Forschungszentrum Jülich* (FZJ) and the *Hahn-Meitner-Institut* (HMI).
- High Magnetic Field Facility for Neutron Scattering Research, proposed by the *Hahn-Meitner-Institut* (HMI).
- European Drilling Research Icebreaker (Aurora Borealis), proposed as part of a European cooperation project under the supervision of the Alfred Wegener Institute for Polar Research (AWI) in Bremerhaven.

The chairman of the Science Council, Professor Karl Max Einhäupl, stressed the special importance of the five proposed facilities which are considered to be worthy of support. "However," said Professor Einhäupl, "the cost of building the facilities (amounting to a total of Euro 4,9 billion) far surpasses all investments of this kind in Germany to date." Thus both the Federal Government and the *Länder* as well as the participating research organisations will be required to reorganise their funding programmes and structures. In

addition, some of the facilities should be designed and financed as European or international facilities (see table in annex).

Einhäupl emphasised: "It will be crucial in the future, too, that the procurement of large-scale facilities is centrally coordinated and that suitable initiatives are assessed according to uniform scientific and research policy criteria. Financing facilities of this size is a continuous process. As a consequence, our statement of views forms the basis for further funding perspectives and decisions." On the basis of the statement and taking into account the subsequent scientific debate on the objectives and funding of the facilities, the Science Council will submit concrete recommendations in autumn 2002 with regard to the facilities whose implementation should be given priority. The Science Council offers to provide further advice in the future on questions relating to the funding of the favourably assessed facilities and also to assess new or revised proposals.

**NB:** The statement on the facilities for basic scientific research (Drs. 5363/02) will be published on the Internet in unabridged form ([www.wissenschaftsrat.de](http://www.wissenschaftsrat.de)). Alternatively, it can be requested per e-mail from the Science Council Secretariat ([sautmann@wissenschaftsrat.de](mailto:sautmann@wissenschaftsrat.de)).

## Annex

### Projects for large-scale facilities assessed by the Science Council on behalf of the Federal Ministry of Education and Research

	Investment costs (million Euro)	Annual operating costs (million Euro)	Construction period (planned)	Funding model
<i>Group 1</i>				
High Field Laboratory Dresden (HLD)	24,5	3,7	4 years	national
High Altitude and Long Range Research Aircraft (HALO)	97	3,8	3 years	national
<i>Group 2</i>				
TeV Superconducting Linear Accelerator (TESLA)	3.450	135	8 years	international
TESLA X-ray Free Electron Laser (TESLA X-FEL)	673,4 <sup>1</sup>	36,1	8 years <sup>2</sup>	European
International Accelerator Facility for Beams of Ions and Antiprotons	675	79	7 years	European
<i>Group 3</i>				
Soft X-ray Free Electron Laser (Soft X-ray FEL)	148	€ 12,4	4 years	national
European Spallation Source (ESS)	1.387	144	7 years	European
High Magnetic Field Facility for Neutron Scattering Research	48,5	4,3	3 years	national
European Drilling Research Icebreaker (Aurora Borealis)	250	10-15	4 years	European

<sup>1</sup> Additional costs for installation of the X-FEL facility. According to present plans, the X-FEL will use the first three kilometres of the TESLA linear accelerator.

<sup>2</sup> If built in combination with the TESLA linear accelerator.