

NUMERICAL DATA DOCUMENTATION IN PHYSICS  
IN THE FEDERAL REPUBLIC OF GERMANY

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Owing to the ever-increasing number of publications it has become more and more difficult for scientists to find physics data relevant to their respective activities in the primary scientific and technical literature. With the exception of their special field of research they have to rely on data compilations. In many fields of physics, however, such data compilations do not exist or do not fulfill the requirements of the users, either because they are out of date or because they are published in places that are not well known. This unsatisfactory situation has been confirmed by an inquiry performed by the German Physical Society in 1972.

In 1974 the German Federal Government passed the "Program of the Federal Authority for the Promotion of Information and Documentation". The aim of this program was the establishment of Specialized Information Centers for the different fields of activity of modern society, such as physics, chemistry, life sciences, earth sciences, materials science, engineering, social sciences, humanities, legislation, transportation etc. A number of these information centers have come into existence during the last years, amongst them the Fachinformationszentrum Energie, Physik, Mathematik in Karlsruhe. It is acting as the central scientific and technical information and documentation center for the fields of

- energy research and technology (nuclear and nonnuclear)
- physics
- mathematics
- astronomy and astrophysics
- space research, aeronautics and astronautics.

The Fachinformationszentrum has a staff of roughly 230 people about 60 of them being scientists. All activities are supported by modern information technologies (including two SIEMENS computers 7760 and 7541) which provide comprehensive and efficient information services on scientific and technical literature, numerical data and on-going research projects. In the fields of astrophysics and space sciences three databases for the retrieval of the relevant literature are offered

- Physics Briefs
- International Nuclear Information System (INIS)
- NASA/ESA Database

A coordination with the work of the Astronomisches Recheninstitut in Heidelberg for the Astronomy and Astrophysics Abstracts is envisaged.

Since the beginning of 1979 the databases of the Fachinformationszentrum are accessible online via the public telephone network and since January 1980 via EURONET. This network, set up by the member countries of the European Communities transmits information using the latest packet-switching technologies. Within the next several months a number of national packet-switching data networks will be connected to each other, such as DATEX-P in Germany, TRANSPAC in France and TELENET-TYMNET in USA. This will lead to a lower priced and more comfortable direct access to databases in different countries.

In the field of numerical data documentation Germany has a long tradition in the publication of comprehensive handbooks in physics and chemistry. The three most widely known of these are:

- Landolt-Börnstein Numerical Data and Functional Relationships in Science and Technology (6th Edition and New Series)
- Gmelin Handbook of Inorganic Chemistry (8th Edition)
- Beilstein Handbook of Organic Chemistry (4th Edition)

Each year a large number of new volumes is added to these handbooks.

The Fachinformationszentrum takes into account the rising demand for selected and evaluated data by gradually expanding data documentation and information. It acts as a national information center for physical data within the Federal Republic of Germany and cooperates with other national and international organizations. In this respect the cooperation with the International Atomic Agency in Vienna for the fields of nuclear data and for atomic and molecular data and with CODATA, the ICSU Committee on Data for Science and Technology, should be specially mentioned.

The center's own activities are focused on the following special subjects:

- high energy physics
- atomic and molecular physics
- crystallography
- nuclear physics
- solid state physics

Data documentation in other fields of physics as well as on properties of materials is being prepared. Expansion into the energy research sector has been started.

Critical selection, evaluation and compilation of data is carried out in close cooperation with research groups at universities, research centers, Max-Planck-Institutes etc. Most of this work is published in Physikdaten/Physics Data, a series established by the Fachinformationszentrum for the publication of data compilations in selected fields of

physics. Up to now 30 issues have been published in this series. Most of the compilations are either constantly brought up to date or else replaced by new editions in due time.

Special reference should be given to a bibliography of data compilations in physics. This bibliography has also appeared in the Physics Data series and contains about 3000 existing data compilations from all fields of physics on a worldwide basis. Nearly all of these data compilations are available in a reference library at the Fachinformationszentrum.

In addition to printed data compilations which have a long tradition in physics computerized data bases have been established in more recent years. The reasons are that large amount of data can be handled conveniently only by computer and that in many cases these data are required for further computer calculations so that they must be available in computer readable form anyhow. In the last part I will give a survey on the larger numerical databanks in physics that are available in Germany.

The Fachinformationszentrum offers the following numerical data banks that have mostly been established in collaboration with other institutions:

- Karlsruhe Charged Particle Reaction Data (KACHAPAG). Cross sections and other data for nuclear reactions with charged particles.
- Cambridge Crystallographic Data Files. Crystal structures of organic and organometallic compounds.
- Inorganic Crystallographic Data Bank. Crystal structures of inorganic compounds.
- Data Bank on Electron Densities in Crystals. Electron density distributions in crystals.
- Data Bank on Crystal Structure Types. Systematic relationships between crystal structures.
- Carbon - 13 Nuclear Magnetic Resonance Data Bank. Nuclear magnetic resonance spectra of organic compounds.
- Data Bank for Molecular Physics in the Gaseous Phase.

This data bank is in preparation at the Section for Structure Documentation of the University of Ulm and the Computer Center of the University of Freiburg. It will give a detailed access to all molecular constants for inorganic and organic molecules published in the literature.

All these databanks will be handled by the general database management system ADABAS and will be made available in online access via the public data networks.

In addition to the Fachinformationszentrum there are a number of other institutions at which numerical data banks are available such as

- Kernforschungszentrum Karlsruhe: Nuclear Data Bank Karlsruhe (KEDAK)
- Deutsche Gesellschaft für chemisches Apparatewesen (DECHEMA) in Frankfurt: DECHEMA Property Data Bank for Chemical Substances
- Betriebsforschungsinstitut des Vereins Deutscher Eisenhüttenleute

in Düsseldorf: Data Bank on Steels and Ferrous Materials

- Lehrstuhl für Metallurgie der Kernbrennstoffe und Theoretische Hüttenkunde at the Technische Hochschule Aachen: Thermochemical Data Bank on Inorganic Materials.

As a final statement one may say that a great demand is faced with an unsatisfactory offer. The number of numerical data banks will continue to increase in the future but not as fast as expected due to the high costs of compilation. These high costs result from the fact that the quality of the stored data must be guaranteed, i.e. they must be checked by time-consuming intellectual evaluation. This means that in physics a situation where all relevant numerical data will be stored for retrieval in special data banks will not be arrived at for decades to come.