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## SCIENCE AND TECHNOLOGY INDICATORS IN FUSION R&amp;T

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**Abstract:**

Scientific Publications disseminate research results and are therefore an interesting subject for Science and Technology (S&T) analysis. Bibliographic databases contain scientific publications which are indexed and structured. In this study \*) Fusion Research and Technology (R&T) records which are stored in the International Nuclear Information System (INIS) bibliographic database are taken into consideration. For the first time, all scientometric and bibliometric information specific to a selected field of science and technology contained in a bibliographic database, using INIS records, is analyzed and quantified. A variety of new science and technology indicators which can be used for assessing research and development activities is also presented.

**Introduction and Method:**

Fusion Research and Technology (R&T) publications are stored in bibliographic databases such as INIS. INIS is a multidisciplinary database administered by the IAEA. The objective of this study is to quantify and analyse Fusion R&T records \*) to offer an overview of the developments in this research field. For the first time scientometric study has been performed to study a selected field of science and technology and the INIS database has been used as a source of data. A variety of science and technology indicators are retrieved. Possible applications of this study are outlined.

**Content:**

Fusion R&T is within the INIS scope and represents about one fifteenth of the whole INIS database (more than 130.000 Fusion R&T relevant records entered in the period from 1970 to mid 1998). In this field, there is an input of 5500-7000 records every year.

Fourteen Member States provide about 95% of the INIS input in Fusion R&T. Fusion R&T records come from 64 different Input Centres..

About 80% of all documents related to fusion are published in English, this includes translated publications.. Altogether, 32 different languages of Fusion R&T records have been encountered.

The main **subject categories** of interest in INIS database are Fusion Research and Fusion Technology with 22 subfields. These subfields are quantified and analysed by highest number of records and by the respective time development, which allows to describe trends in Fusion Research and Technology.

The **record type** (e.g. journal articles, reports, books, miscellaneous, patents) and literary type (e.g., short-communications, conferences, numerical data, progress reports) of each

\*) This paper is a summary of the Science and Technology Indicators in Fusion R&T part of a study titled: "Fusion Research and Technology in the INIS Bibliographic Database". A survey on publications in Fusion Research and Technology. Science and Technology Indicators in Fusion R&T. Claus-D. Hillebrand, IAEA, Division of Scientific and Technical Information, Vienna, 1998.

record entry is indicated in the database. This allows the publishing format to be characterized. Journal articles represent about 50% of all records, reports 31%, books 13%, miscellaneous 5% and patents 1%. In the study, the publication types are quantified and analysed by time development and input country.

The **country** tag in the **author** field indicates, better than the country in which the document has been published, the actual national research activities. More than 86% of the authors come from the "ITER countries". The country distribution of authors somewhat resembles the distribution of the world Gross National Product (GNP) and is different from the distribution of input countries because in some of them there is a high concentration of science publishing houses.

**Journal articles** are published in more than 1500 different journals and represent about 50% of all Fusion R&T records in INIS. Whereas the 15 journals (1%) with the highest number of fusion relevant journal article records (more than 1000 records per journal) represent 57% of all journal records, the further 63 journals (4.2 %) with more than 100 and less than 1000 records represent about 29% of all journal records. Journals with more than 10 but less than 100 records represent about 10% of all journal records. Journal articles with 4 pages are the most frequent, and the average is 7.3 pages.

The survey study "Fusion Research and Technology in the INIS bibliographic database" contains a list of **journal profiles** in which for larger journals the number of records are plotted against the Fusion R&T subfields. The profiles allow comparison of the scope of each journal. The list of fusion journals in the survey contains a ranking of journals by number of records (which is a function of publication years, input years, articles published per year and scope) and is compared with the list of the Science Citation Index (SCI) of the Institute of Scientific Information (Philadelphia, USA). The comparison shows that, for instance, the scope of the SCI list in Fluids and Plasmas (not controlled fusion itself) is broad but does not cover certain fields such as material studies, etc. Furthermore, the Fusion Technology journals are not separated from Fusion Research journals in the SCI list.

**Outlook:**

The survey study "Fusion Research and Technology in the INIS bibliographic database" contains many tables and graphs which are the basis of this summary and provides more detailed information. A basic analysis was performed aiming at different interest groups such as the scientific and technology community, science publishers and editors, librarians and science managers.

In the study, additional information on science and technology indicators and trends is also shown as well as information on Fusion R&T related publications and their formats. The study will be published by the IAEA in the near future.

Further, more advanced and focused analyses and evaluation of the data for some of these interest groups are also possible. The survey opens the possibility of further studies, e.g. the co-operation between different institutions and countries, mapping publication patterns, highlighting scientific co-operation, development of human resources etc. Scientometric studies can assist in analysis and formulation of science and technology policy by mapping changes in research activities, providing thematic and strategic analysis of relative position of research communities; sketching profiles of activities and performance of countries and institutions.

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