

**DIRECTIONS FOR FUTURE CORE PHYSICS EFFORTS
AND INTERNATIONAL CO-OPERATION**

Summary of an open discussion

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The purpose of this open discussion was to obtain suggestions from participants in the Specialists' Meeting for worthwhile future core physics efforts and international co-operation. The open exchange of experience which occurred in the papers and associated discussions during the four sessions of the Specialists' Meeting provided a good basis for this discussion.

In general it was noted that the HTGR core physics community has the challenge to extract the maximum amount of information from limited experimental data. In that context, the specialists were encouraged to make optimal use of existing data from power reactors including the Thorium High Temperature Reactor (THTR), the Arbeitsgemeinschaft Versuchs Reaktor (AVR), Fort St. Vrain, British and French GGRs and report results of comparisons with analytical predictions at the next IAEA Specialists' Meeting.

In the future, core physics data from the Japanese HTTR will be of considerable international interest. The international project underway at the PROTEUS criticals facility at Paul Scherrer Institute will provide needed validation data. Also data from existing critical experiments, for example VHTRC (in Japan), ASTRA, GROG (in the USSR) and the LEU experiments at the CNPS (in USA) would be very useful to the international community for methods validation. The IAEA Co-ordinated Research Programme on Validation of Safety Related Reactor Physics Calculations for Low-Enriched HTGR's provides a forum for detailed information exchange from such experiments.

It was noted that HTGR core physics experts should be closely involved in the various working groups which establish basic nuclear cross section data files to assure high quality data appropriate to HTGR conditions. Some problem areas, including important U^{235} cross section data, in new nuclear data files were discussed.

It was also noted that the accuracy of decay heat predictions is important to assessments of safety margins especially in new HTGRs which rely on passive systems for decay heat removal. The accuracy of decay heat formulations relative to experimental information, and the sensitivity of the reactor behaviour to uncertainties in decay heat generation was identified as a topic which could be addressed in papers presented at the next Specialists' Meeting.

The value of comparisons of international benchmark calculations was also discussed. Comparing analytical predictions for a well defined problem is a method of examining important aspects of different analytical approaches such as the method of preparation of cross section sets, geometric representation of reactor components and theoretical techniques. The consensus was that establishment of two well defined

benchmark problems (one for a prismatic MHTGR and one for a pebble bed modular system) should be recommended to the International Working Group on Gas Cooled Reactors (IWGGCR) at their next meeting. The benchmark problems should be provided to the international HTGR core physics community for analysis and results should be reported to the next Specialists' Meeting.

The importance of close co-ordination in the area of HTGR core physics between IAEA and the OECD NEA Reactor Physics Committee was also stressed.

Finally, to answer questions related to safety, it is important to confirm predictions of reactor behaviour at accident conditions. Where large margins exist, the predictions need not be extremely accurate; rather the important phenomena must be clearly understood. In this context new experiments examining important phenomena at accident conditions should be pursued. The specialists had the consensus that the IWGGCR should consider what could be done to establish international co-operation in new experiments at new conditions which would confirm predictions of reactor behaviour under accident conditions.