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INTERNATIONAL ATOMIC ENERGY AGENCY  
in co-operation with the  
COMMISSION OF THE EUROPEAN COMMUNITIES

International Symposium on Management of Low- and Intermediate-  
Level Radioactive Wastes

Stockholm, Sweden

16-20 May 1988

INFORMATION SHEET

1. Introduction

From the very beginning, the primary consideration in nuclear waste management has been the effective protection of the public and the biosphere from potential hazards arising from this waste.

Extensive experience has been achieved with the management of radioactive waste based on several thousands of reactor-years operation and use of radioisotopes in medicine, agriculture, industry and research. Like any other technologies waste management has been a dynamic process since its beginning. Many reports and papers on low- and intermediate-level waste management have been published, and this subject was discussed at several international conferences and symposia. However, the last Agency symposium on this particular topic was organized in France in 1970. This subject among others was also covered at the Waste Management Conference in Seattle, USA in 1983, the Luxembourg Conference of the CEC in 1985 and at a number of other IAEA, CEC seminars and workshops. Since that time new developments have taken place and several concepts and improvements have been reported in all aspects of management of low- and intermediate-level waste. These refer in particular to reduction of waste arising at source, volume reduction of the waste products and improvement of the waste form stability.

The commissioning of repositories for low- and intermediate-level radioactive waste, a subject which was discussed in detail at the IAEA Symposium in Hanover 1985, has given better possibilities to optimize the different treatment and conditioning methods used in waste management. As a result, more emphasis has been given to the pre-treatment steps in waste management and volume reduction technologies for low- and intermediate-level waste. The achievements in this field have been reported at recent topical and specialists' meetings. However, this symposium will provide the opportunity for exchanging information on the management of low- and intermediate-level radioactive waste on a much broader basis.

At the Stockholm symposium attention will be focused on more recent developments and advancements in the correlation between treatment and disposal and the processing of low- and intermediate-level radioactive wastes, with the prospect of further improvement of waste management technologies, design and operation of waste management facilities. The symposium will also address recent developments in quality control of conditioned waste intended for disposal.

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## 2. List of topics

The symposium will consist of eight sessions with presentations of papers on specific topics by invited experts and contributed papers from participants. The contributed papers to be presented will deal with recent developments in the following subjects:

- national and international waste management programmes and policies;
- techniques and practices for pre-treatment of waste;
- treatment and conditioning of liquid waste (including volume reduction and conditioning of liquid waste concentrates);
- treatment and conditioning of solid waste (including volume reduction);
- treatment and conditioning of mixed wastes (including chemically and biologically toxic substances);
- waste characterization, quality control and acceptance criteria;
- disposal options, performance and safety assessment;
- special techniques for handling and treatment of organic and other specific wastes from institutes, hospitals and industry;

## 3. Participation

All persons wishing to participate in the meeting are requested to complete a Participation Form (see attached Form "A") and send it as soon as possible to the competent official authority (Ministry of Foreign Affairs or national atomic energy authority) for subsequent transmission to the Joint Secretariat. A participant will be accepted only if the Participation Form is transmitted through the government of a Member State of the International Atomic Energy Agency, of the Commission of the European Communities or by an organization invited to participate.

Participants whose designations have been received by the Joint Secretariat will be notified directly two to three months before the meeting.

## 4. Visas

Designated participants who require a visa to enter Sweden should submit the necessary application to the nearest diplomatic or consular representative of Sweden as soon as possible.

## 5. Expenditures

As a general rule, the sponsoring organizations do not pay the cost of attendance, i.e. travel and living expenses, of participants. However, limited funds are available to help meet the cost of attendance of selected specialists from developing countries with low economic resources. Generally, not more than one grant will be awarded to any one country.

If governments wish to apply for a grant on behalf of one of their specialists, they should address specific requests to the Director General of the International Atomic Energy Agency to this effect. Governments should ensure that applications for grants:

- (a) be submitted by 2 November 1987;
- (b) be accompanied by a duly completed and signed Grant Application Form (as attached).

Applications which do not comply with the conditions mentioned under (a) and (b) cannot be considered.

The grants awarded will be in the form of lump sums usually covering part of the cost of attendance.

The costs for the organization of the meeting are borne by the sponsoring organizations and the Host Government. No registration fee is charged to participants.

#### 6. Papers

The submission of a paper implies that the author intends to participate in the meeting if it is accepted. It is therefore necessary that the Participation Form (Form "A") is also completed by authors.

All papers - apart from invited reviews - must present original work; they should not have been published elsewhere.

It should be noted that, in order to provide ample time for discussions, the number of papers that can be accepted for presentation at one of the regular sessions of the meeting and for subsequent publication in the proceedings will be limited. If the number of relevant and high quality papers submitted for selection considerably exceeds the number that can be accepted for the regular sessions, poster sessions may be arranged.

A completed Form for Submission of a Paper (see attached Form "B") must be sent to the competent official authority for transmission to the Joint Secretariat in time to reach it by 16 October 1987 (see section 12 below), together with six copies of an extended synopsis of a maximum of 800 words (i.e. two A4 format pages of single-spaced typing or the equivalent, including any tables or diagrams and a few pertinent references). This synopsis should give detailed information on the contents of the proposed paper, in order to enable the paper selection committee to give it proper evaluation. Introductory and general matters should not be included. The synopsis - if accepted - will be reproduced (reduced to about 70% of its original size) in unedited form in the Book of Extended Synopses: therefore the original must be submitted as a camera-ready copy. The general style and presentation should be as in the attached sample.

Authors will be informed whether their papers have been accepted for presentation at a regular session and, if so, the following procedure will have to be adhered to:

- (a) If changes or corrections are necessary, a revised version of the extended synopsis for inclusion in the Book of Extended Synopses may be sent to the Joint Secretariat by 16 March 1988. If no revised synopsis is received by the above date, the original version will be included;

- (b) Six copies of the full text of the paper, preceded by an abstract of 300 words maximum (including the master copy), must be sent direct to the Joint Secretariat by 1 April 1988, as these are required by the editor of the proceedings to be published;
- (c) Please note that the Joint Secretariat does not prepare preprints. Authors themselves should therefore arrange for the printing and provision of 250 copies of their papers for general distribution to the participants during the meeting. The printing and transportation costs to the place of the meeting are at the author's expense.

Authors whose papers have been accepted for "poster presentation" will in due course receive instructions for the preparation of the poster. The extended synopses of their posters will be included in the Book of Extended Synopses which will be distributed at the beginning of the meeting, and will also be published in the proceedings.

Authors are requested to adhere strictly to the deadlines set above.

#### 7. Working languages

Working languages of the meeting will be English, French, Russian and Spanish. All communications, synopses, abstracts and papers must be sent to the Joint Secretariat in one of these languages.

Simultaneous interpretation may be provided between all the working languages, if six weeks before the meeting it is seen from the Participation Forms received, that these are required.

#### 8. Distribution of documents

A preliminary programme of the Symposium will be sent to the participants before the meeting.

The final programme, the Book of Extended Synopses in the original language and preprints, to the extent available, will be distributed on registration.

#### 9. Accommodation

Detailed information on accommodation and other items will be sent direct to all designated participants well in advance of the meeting.

#### 10. Proceedings

The proceedings of the meeting will be published by the International Atomic Energy Agency as soon as possible after the meeting. They will include all papers presented, printed in full in the language of submission, together with abstracts in the original language and in English. In addition they will include extended synopses of poster presentations. With a view to speeding up publication of the proceedings and reducing its costs, the length of the papers will be strictly limited.

Participants who order copies of the proceedings in advance during the meeting will be entitled to a 50% discount.

11. Joint Secretariat

The address of the Joint Secretariat is:

International Atomic Energy Agency  
IAEA-SM-303  
Vienna International Centre  
P.O. Box 100  
A-1400 Vienna  
Austria

Telephone No.: Austria - 222 - 2360 plus extension  
Telex No.: 1-12645  
Telefax No.: 43 222 230184  
Cable address: INATOM VIENNA

The Scientific Secretaries of the Symposium are Mr. V. Efremkov, Division of Nuclear Fuel Cycle, International Atomic Energy Agency (telephone extension 2659) and Mr. L. Cécille, Nuclear Fuel Cycle Division, Commission of the European Communities (telephone no. 00322-235-75-88). The Conference Service Section, Division of External Relations, is responsible for administrative arrangements (telephone extension 1312).

12. Channels of communication

The Participation Form and the Form for the Submission of a Paper, together with six copies of each synopsis, and, if applicable, the Grant Application Form, should be sent to the competent official authority (Ministry of Foreign Affairs, national atomic energy authority) for transmission to the Joint Secretariat.

Subsequent correspondence on scientific matters should be sent to the IAEA Scientific Secretary and correspondence on administrative matters to the Conference Service Section.

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COMMISSION OF THE EUROPEAN COMMUNITIES

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16-20 May 1988

## PARTICIPATION FORM

Family name:		All initials of given names:		Mr. Ms.
Institution:		Full address:		
		For urgent communications please indicate: Telefax No.: Cable address: <span style="float: right;">Telex No.:</span>		
Nationality:	Designating government or organization:			
Mailing address (if different from address of institution):				
Date of departure from mailing address:				

Indicate below in which of the meeting languages you are able to follow the proceedings of the meeting and in which language(s) you can express yourself:

Language	English	French	Russian	Spanish
Speaking				
Understanding				

Do you intend to present a paper?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
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IS  ${}^6\text{Li}(\gamma, T){}^3\text{He}$  A DIRECT REACTION?\*

D. CLEMENT, H.W. WITTERN

Institute of Theoretical Physics, University of Tübingen, Fed. Rep. Germany

We aim to show that the cluster model description of  ${}^6\text{Li}$  can at least qualitatively account for the nuclear photo reaction  ${}^6\text{Li}(\gamma, T){}^3\text{He}$ . We assume this process to be a direct reaction. The cross-sections  $\sigma$  for electric dipole transitions are evaluated in two ways: (i) for point clusters, the results being plotted in curve a of Fig.1, and (ii) for extended clusters. In the latter case we use the wave function given by Schmid et al. [1] for the initial state, and in the final state a plane wave for the relative motion and ground state wave functions for the fragments. Both wave functions are properly antisymmetrized. These results are shown in curve b of Fig.1.

Both curves reproduce the general trend at the correct order of magnitude of the partly incompatible experimental data (see Fig.1). It should be noted, however, that calculations of the reduced matrix elements for the excitation of the 2.18 MeV level in  ${}^6\text{Li}$  suggest that the calculated cross-sections are too large by a factor of about two, indicating some failing of the wave functions used.

Our model does not reproduce the broad peak at about 21 MeV excitation energy reported by Bazhanov and Murakami. The occurrence of this peak is also inconsistent with the scattering phases of the final state [2]. The only appreciable scattering phase in this region is  $\delta_0$ , but the corresponding magnetic dipole transition is rather weak. This channel can hardly lead to the supposed peak at 21 MeV.

It is conceivable that the peak results from an interference of E1 and E2 transitions. However, the calculated scattering phases do not show any anomaly in the energy region under consideration, though there is some indication that the actual phase shifts deviate somewhat from the phase shifts calculated using resonating group methods [2].

We arrive at the following conclusions:

1. It is certainly necessary to repeat the calculations as soon as better wave functions are available.
2. In the absence of any appreciable phase shifts in the relevant final states the reaction might very well be viewed as a direct reaction.
3. Better values for the experimental phase shifts of the  $T = 1$ ,  $S = 1$  scattering states would clarify the situation.
4. Angular distributions of the photoproducts at about 21 MeV excitation energy could yield the quantum numbers to be assigned to final states that possibly compete with the E1 transitions discussed here.

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\* Supported by Bundesministerium für Forschung und Technologie.

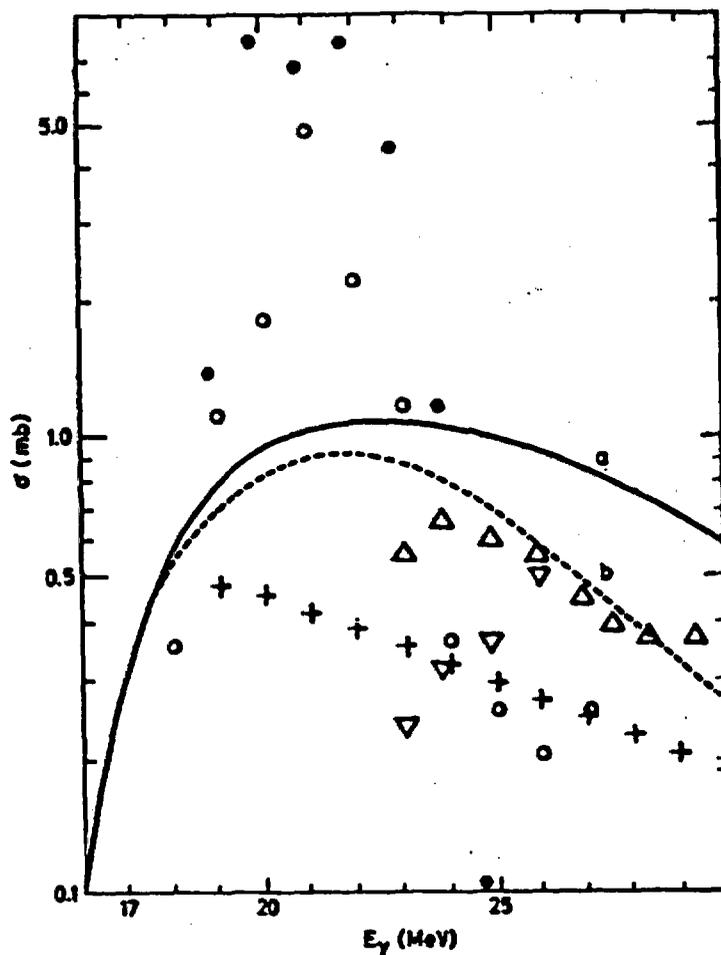


FIG.1. Cross-section for  ${}^6\text{Li}(\gamma, T){}^3\text{He}$  (a) for point clusters and (b) for extended clusters. Experimental data:  $\bullet$  Bazhanov et al. [3];  $\Delta, \nabla$  Manuzio et al. [4];  $\circ$  Murakami [5];  $+$  Sherman et al. [6].

#### REFERENCES

- [1] SCHMID, E.W., et al., Phys. Lett. 7 (1963) 263.
- [2] THOMPSON, D.R., TANG, Y.C., Nucl. Phys., A 106 (1968) 591.
- [3] BAZHANOV, E.B., KOMAR, A.P., KULIKOV, A.V., MAKHNOVSKI, E.D., Nucl. Phys. 68 (1965) 191.
- [4] MANUZIO, G., MALVANO, R., RICCO, G., SANZONE, M., Nuovo Cim., B 40 (1966) 300.
- [5] MURAKAMI, A., Nuovo Cim., B 55 (1968) 604.
- [6] SHERMAN, N.K., BAGLIN, J.E.E., OWENS, R.O., Phys. Rev. 169 (1968) 771.

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COMMISSION OF THE EUROPEAN COMMUNITIES

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## FORM FOR SUBMISSION OF A PAPER

TITLE of the paper:		
Language in which the paper will be written: English <input type="checkbox"/> French <input type="checkbox"/> Russian <input type="checkbox"/> Spanish <input type="checkbox"/>		
AUTHOR(S) Initial(s) and Family name(s)	Scientific establishment(s) in which the work has been carried out	Town/ Country
1.		
2.		
3.		
4.		
5.		
AUTHOR who will present the paper:		Mailing address:
Mr./Ms.		
Initial(s):		
Family name:		For urgent communications please indicate: Telefax No.: Cable address: Telex No.:
<p>I hereby agree to assign to the International Atomic Energy Agency</p> <p style="margin-left: 40px;"><input type="checkbox"/> the copyright or</p> <p style="margin-left: 40px;"><input type="checkbox"/> the non-exclusive, royalty-free licence</p> <p>to publish the above-mentioned paper, and certify that no other rights have been granted which could conflict with the right hereby given to the Agency.</p>		
Date:		(Signature of main author)

as to be listed in printed programme

Enclosures: 6 copies of extended synopsis

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**GRANT APPLICATION FORM\***

Name: (Mr/Ms)  
Mailing Address:  
Telex No.:  
Telefax No.:  
Cable address:  
Telephone:  
Date of Birth (Year/Month/Day):  
Nationality:

**1. EDUCATION (Post-Secondary)**

Name and place of institution	Field of study	Diploma or degree	Years attended	
			from	to

**2. RECENT EMPLOYMENT RECORD (Starting with your present post)**

Name and place of employer/organization	Title of your position	Type of work	Years of service	
			from	to

**3. DESCRIPTION OF WORK (Performed over the last three years)**

**4. INSTITUTE'S/MEMBER STATE'S PROGRAMME IN FIELD OF MEETING**

.....  
Date

.....  
Signature of Applicant

.....  
Date

.....  
Name and title (printed) and signature of responsible Government official

\* To be completed only by participants from developing countries on whose behalf a grant is requested.