International Atomic Energy Agency

INDC(CCP)-148/L

INDC INTERNATIONAL NUCLEAR DATA COMMITTEE

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(Excerpt translation from USSR report Nuclear Constants, 3 (34) page 3, also distributed as INDC(CCP)-140/G)

Translated by the IAEA
June 1980

IAEA NUCLEAR DATA SECTION, WAGRAMERSTRASSE 5, A-1400 VIENNA

Reproduced by the IAEA in Austria
June 1980

80-3374

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UDC 621.173.4

EVALUATION OF THE ^{235}U FISSION CROSS-SECTION IN THE ENERGY RANGE 0.1 keV-20 MeV

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ABSTRACT

A method based on correlations between the errors in different experimental results is proposed for determining errors in evaluated data. In order to use these correlations, total experimental errors are divided up into partial errors. The way in which this method is linked with the least-squares method is demonstrated. Matrices of the correlations between experimental results for each type of partial error and for different energy ranges are given as well as information on partial errors. The method is used in the paper for evaluating ^{235}U fission cross-sections in Soviet and foreign publications, and evaluated data are given. Comparison of the evaluated data with ENDF/B-V data shows that they agree to within 1-3%.

In recent years experimental measurements of the ^{235}U fission cross-section (σ_f) have been published showing a difference from those previously available as a result of the application of more up-to-date experimental techniques, entailing smaller errors [1-8]. In addition, the new data give lower figures for the cross-section. For this reason it has become necessary to perform a new evaluation of the ^{235}U fission cross-section on the basis of the new data as well as those obtained earlier. It should be mentioned that, when performing evaluations, special attention should be paid not only to fission cross-section values themselves, but also to the error in evaluation, since a fairly strong correlation can be found between the errors in many experimental studies due to the use of similar measurement methods and standards.

Reference [9] proposes a method of evaluation by means of which a detailed analysis of the correlations between the errors in different experiments can be performed. The method is based on the division of errors into different types of partial error, which are independent in each experiment, with a view to using the correlations between them. The total errors in different experiments are correlated with each other by means of the partial errors. Using this method an expression can be found for the estimated cross-section σ_{est} and the actual but unknown cross-section σ_0 [9]:

$$\overline{|\sigma_{est}-\sigma_0|^2}=\sum_{k=1}^{NS}\sum_{i=1}^{NA}\sum_{j=1}^{NA}a_i a_j K_{kij}\sqrt{\overline{|\Delta\sigma_{ik}|^2}}\sqrt{\overline{|\Delta\sigma_{jk}|^2}}\ , \tag{1}$$

where the coefficient of correlation between the k partial errors of the i-th and j-th experiments

$$K_{kij}=\frac{\overline{\Delta\sigma_{ik}}\,\overline{\Delta\sigma_{jk}}}{\sqrt{\overline{|\Delta\sigma_{ik}|^2}}\sqrt{\overline{|\Delta\sigma_{jk}|^2}}}\ ; \tag{2}$$

$\Delta\sigma_{ik,jk}$ is the k-th partial error of the i-th (j-th) experiment; NS is the number of partial errors; NA is the number of experiments involved in the evaluation; and a_{ij} is the statistical weight given to an experiment, where

$$\sum_{i=1}^{NA}a_i=1\quad(a_i>0)\,. \tag{3}$$

In the evaluation, experimental data are given weights which minimize that the error in the estimated value (1). Clearly, these weights depend on the partial experimental errors and on the coefficients of correlation between them, i.e. they reflect the actual situation and indicate the value of a given set of experimental results. We propose to show that in the case of a total lack of correlation this method is equivalent to the least-squares method with statistical weights in inverse proportion to the square of the error. Here, $K_{kij}=\sigma_{ij}$, and Eq. (1) has the form

$$\overline{|\sigma_{est}-\sigma_0|^2}=\sum_{k}^{NS}\sum_{i}^{NA}a_i^2\,\overline{|\Delta\sigma_{ik}|^2}=\sum_{i}^{NA}a_i^2\,\overline{|\Delta\sigma_i|^2}\ . \tag{4}$$

The values of a_i which minimize $\overline{|\sigma_{est}-\sigma_0|^2}$ can be found from the condition

$$\begin{cases} \dfrac{\partial}{\partial a_n}\overline{|\sigma_{est}-\sigma_0|^2} = 0, & n \neq \ell ; \\ \Sigma a_i = 1 . \end{cases} \tag{5}$$

Let us modify Eq. (4), taking the l-th experiment, as follows:

$$\overline{|\sigma_{est}-\sigma_0|^2} = \sum_{i\neq\ell} a_i^2\,\overline{|\Delta\sigma_i|^2} + a_\ell^2\,\overline{|\Delta\sigma_\ell|^2}$$

and perform the substitution $a_\ell = 1 - \sum_{i\neq\ell} a_i$. Now

$$\overline{|\sigma_{est}-\sigma_0|^2} = \sum_{i\neq\ell} a_i^2\,\overline{|\Delta\sigma_i|^2} + \sum_{i\neq\ell}\sum_{m\neq\ell} a_i a_m\,\overline{|\Delta\sigma_\ell|^2} - 2\sum_{i\neq\ell} a_i\,\overline{|\Delta\sigma_\ell|^2} + \overline{|\Delta\sigma_\ell|^2} . \tag{6}$$

By differentiating Eq. (6) with respect to a_n, where n = 1, ..., NA(n ≠ l), we obtain the NA − 1-th equation of the type

$$\frac{\partial\overline{|\sigma_{est}-\sigma_0|^2}}{\partial a_{n,\,n\neq\ell}} = 2a_n\overline{|\Delta\sigma_n|^2} - 2\overline{|\Delta\sigma_\ell|^2} + 2\sum_{i\neq\ell} a_i\overline{|\Delta\sigma_\ell|^2} \tag{7}$$

or $a_n\overline{|\Delta\sigma_n|^2} = \left(1 - \sum_{i\neq\ell} a_i\right)\overline{|\Delta\sigma_\ell|^2}$,

from which, applying the condition $1 - \sum_{i\neq\ell} a_i = a_\ell$, we obtain

$$\frac{a_n}{a_\ell} = \frac{\overline{|\Delta\sigma_\ell|^2}}{\overline{|\Delta\sigma_n|^2}}, \quad n\neq\ell,\ i = 1,\dots,NA . \tag{8}$$

Thus, where there are no correlations between errors in experiments, the weights are in inverse proportion to the squares of the errors.

Where correlations are found, Eq. (5) is reduced to a system of NA − 1 linear equations:

$$\frac{\partial|\sigma_{est}-\sigma_o|^2}{\partial a_{n,n\neq\ell}} = 2\sum_{k}^{NS}\sum_{i\neq\ell}^{NA} a_i\Big(K_{kin}\sqrt{\overline{|\Delta\sigma_{ik}|^2}}\sqrt{\overline{|\Delta\sigma_{nk}|^2}} - K_{ki\ell}\sqrt{\overline{|\Delta\sigma_{ik}|^2}}\sqrt{\overline{|\Delta\sigma_{\ell k}|^2}} -$$
$$- K_{k\ell n}\sqrt{\overline{|\Delta\sigma_{\ell k}|^2}}\sqrt{\overline{|\Delta\sigma_{nk}|^2}} + K_{k\ell\ell}\sqrt{\overline{|\Delta\sigma_{\ell k}|^2}}\sqrt{\overline{|\Delta\sigma_{\ell k}|^2}}\Big) +$$
$$+ 2\Big(K_{kn\ell}\sqrt{\overline{|\Delta\sigma_{nk}|^2}}\sqrt{\overline{|\Delta\sigma_{\ell k}|^2}} - K_{k\ell\ell}\sqrt{\overline{|\Delta\sigma_{\ell k}|^2}}\sqrt{\overline{|\Delta\sigma_{\ell k}|^2}}\Big) = 0. \qquad (9)$$

Eq. (1) gives the error in the estimated value for an individual point on the curve. We can determine the coefficient of correlation for the errors at any two evaluated points n and m as follows:

$$B_{nm} = \frac{\overline{\Delta\sigma_n\,\Delta\sigma_m}}{\sqrt{\overline{|\Delta\sigma_n|^2}}\sqrt{\overline{|\Delta\sigma_m|^2}}}\,, \qquad (10)$$

where $\Delta\sigma_n$ and $\Delta\sigma_m$ are the errors in estimated values at the points involved. These are determined as follows:

$$\Delta\sigma_n = \sum_{i}^{NA}\sum_{k}^{NS}\Delta\sigma_{ikn}a_{in} \qquad (11)$$

and

$$\Delta\sigma_m = \sum_{j}^{NA}\sum_{k}^{NS}\Delta\sigma_{jkm}a_{jm}\,, \qquad (12)$$

where a_{jm} is the weight of the j-th experiment when it is used in the evaluation at the point m; $\Delta\sigma_{jkm}$ is the k-th partial error in the j-th experiment at the point m. Similarly, a_{in} and $\Delta\sigma_{ikn}$ are the weight and the k-th partial error in the i-th experiment when it is used in the evaluation at the point n.

By introducing the coefficient of correlation for k errors in the i-th and j-th experiments at the points n and m (as previously, the partial errors in any one experiment are taken to be independent)

$$K_{kinjm} = \frac{\overline{\Delta\sigma_{ikn}\Delta\sigma_{jkm}}}{\sqrt{\overline{|\Delta\sigma_{ikn}|^2}}\sqrt{\overline{|\Delta\sigma_{jkm}|^2}}} \tag{13}$$

and assuming it to be independent of the point chosen ($K_{kinjm} = K_{kij}$), we obtain the coefficient of correlation between errors in points on the curve for the energy dependence of the fission cross-section

$$B_{nm} = \frac{\sum\limits_{k}^{NS}\sum\limits_{i}^{NA}\sum\limits_{j}^{NA} a_{in}a_{jm}K_{kij}\sqrt{\overline{|\Delta\sigma_{ikn}|^2}}\sqrt{\overline{|\Delta\sigma_{jkm}|^2}}}{\sqrt{\overline{|\Delta\sigma_{n}|^2}}\sqrt{\overline{|\Delta\sigma_{m}|^2}}} . \tag{14}$$

The algorithm described was applied on a computer program which, on the basis of the partial errors and correlations between them, uses the iteration method to find the weights for the experimental data minimizing the error in the estimated value, and also the errors in the estimated values at various points, with the coefficients of correlation between them.

The ^{235}U fission cross-section was evaluated for two energy regions: 100 eV-100 keV, where the cross-section has a distinct structure, and 100 keV-20 MeV, where the fission cross-section can be represented by a smooth curve. The experimental data obtained for the thermal energy region need to be renormalized by a common method. Errors due to the shift in the energy scale and the difference in energy resolution can be minimized by normalization to a wide range of energies (100 eV-1 keV). Table 1 [1] shows fission integrals for ^{235}U.

The ^{235}U fission cross-section in the energy region below 1 eV was evaluated in Ref. [1], where at 0.0253 eV it was found to be (583.54 ± 1.7) b. This value agrees with the one given in Ref. [2], where at 0.0253 eV the fission cross-section is (583.5 ± 1.3) b.

In Ref. [10] the fission integral from 7.8 to 11 eV is proposed as a possible region for renormalization. The analysis performed in Ref. [1] showed that there is a systematic deviation of the results given in Ref. [10] from the evaluated curve. This may be due to the variation in channel width of the analyser in this region. Thus, normalization only to the data of Ref. [10] may not be advisable. However, there are other measurement data available for the thermal energy region [4, 7, 11-15]. By renormalizing them to a fission cross-section of 583.5 b at 0.0253 eV the fission integral from 7.8 to 11 eV can be calculated. Reference [1] gives a value of (241.24 ± 6.75) b • eV, obtained as a mean-weighted value [4, 7, 10, 11] for the evaluated fission integral for 7.8-11 eV. Here, the data from Ref. [12] were used with a three-fold reduction in the weight as a result of the considerable deviation from other results. The data from Ref. [13] were not used since they were obtained only in the region up to 10 eV. The data in Refs [14, 15] were not used because of the considerable difference in the shape of the curves and the systematic difference in the results for the thermal region. The error in the fission integral - ± 2.8% - was obtained [1] on the assumption that this value in Ref. [4] is 50% likely to be correct.

Table 2 shows fission integrals in the range 0.1-1.0 keV. There are seven sets of experimental data in this energy region that can be considered absolute [4, 7, 8, 16-18], the first five of which cover the thermal region and can be renormalized to the fission integral for 7.8-11 eV, which is equal to 241.24 b • eV on the basis of data from Table 1. The concept of normalization used is the same one as in drawing up ENDF/B-V [23]. The coefficient of renormalization for these data is given in Table 2. Before normalization it was necessary to correct for the up-to-date cross-sections for the ^{10}B(n,α) and ^{6}Li(n,α) reactions [3]. The data from [17] and [18] were obtained by the underground explosion technique beginning at an energy of 20 eV, and thus cannot be renormalized in the region 7.8-11 eV. Since these data are absolute measurements and at low energies the correction for the angular distribution of the ^{6}Li(n,α) reaction which needs to be made to them is small, they were used to obtain the mean-weighted fission integral in the range 0.1-1.0 keV, even though their influence is small as a result of high error (approximately 8%). The mean-weighted fission integral in the region 0.1-1.0 keV is (11883 ± 446) b • eV. The experimental data in Ref. [11] were assigned an error of 3.3%. After renormalization to

(241.24 ± 6.75) b • eV (approximately 2.8%) the error rose to 4.31%. The most up-to-date experimental data [7, 8] may have an error of 2%. After renormalization the error rises to 3.8%. The mean-weighted integral has an error of approximately 3.8%. All the experimental data available agree to within the limits shown in Table 2. The remainder of the experimental data in this table were used as relative data and in the region 0.1-1.0 keV were renormalized to (11883 ± 446) b • eV. The coefficients of renormalization are shown in the same table.

In the region above 10 keV it becomes necessary to renormalize relative data obtained for the region 2-100 keV [24] and the relative data of Refs [5, 25]. For renormalization the region 10-30 keV was chosen and the results from Refs [4, 7] were used. The mean fission integral in the region 10-30 keV according to these sets of data, which differ from each other by 2.3%, is 45580 b • eV. Data from Ref. [19], although agreeing well (to within 1%) with Refs [4, 7], were not used for normalization because of insufficient reliability in this region. The data from Ref. [5, 25] were renormalized to the fission integral in the region 10-30 keV, which is equal to 45580 b • eV. It appears that the error in this normalization integral is approximately 5% and is caused mainly by the error in normalization in the thermal region. The data from Ref. [24] in the region 2-10 keV were renormalized to those given in Ref. [11] (i.e. to the fission integral for the region 0.1-1.0 keV).

The evaluated data in the energy region 10-100 keV are determined from the results in [4, 5, 7, 17, 19, 24, 25], which in the region above 30 keV agree among themselves (with the exception of the data in [24]) to within ± 2.7%; in the region 80-90 keV they do not agree so well (to within ± 3.8%). On the average, the time-of-flight data obtained by renormalization in the low-energy region agree with absolute data [26] obtained from measurements with photoneutron sources to within ± 3%.

In the energy region 100-200 keV the data in Refs [4, 5, 25] were used in conjunction with measurements made on electrostatic generators at different values [27-31]. Comparison of the results of [24] with the new data obtained by I. Szabo [30] shows that, at energies below 100 keV, the former data agree with the results of Ref. [30] to within ± 6%, the data of [4] and [31] to within ± 2.5%, and those of [4] and [30] to within ± 2.8%. In the region of 140 keV the data of [25] and [4] agree to within ± 3.2%.

For the region 200 keV-1 MeV there are data available [26-30, 32, 33] which agree among themselves to within ± 3%. In addition, results have been obtained for hydrogen [25], and fission cross-sections have been measured for the ^{6}Li(n,α) reaction [7]. These last figures lie approximately 10% lower than the results of Refs [26-28, 30], and their uncertainty is due mainly to the fact that the ^{6}Li(n,α) reaction cross-section in the region above 100 keV is not accurately known. The renormalized data of [25] are also somewhat lower [5] (by approximately 5%) than the cross-sections given in Refs [26, 30]. The renormalized data of [5] agree comparatively well (to within 1%) with the results of [25] and, in the region above 800 keV, with the measurements of [26, 33]. A systematic discrepancy (of approximately ± 5%) is observed in the region 250-300 keV, where the cross-sections given in Ref. [25] are lower than most other measurements. In the region 500-800 keV a discrepancy is found between the data of [34] and most other results where both the "shape" and the absolute value are concerned.

For the energy region above 1 MeV there are data available [26-28, 30], while for the region 1-6 MeV there are absolute measurements [32] and for the region 0.8-20 MeV there are relative measurements [33]. All these results can be taken to agree among themselves to within ± 3%.

For the region 1-1.3 MeV the cross-sections measured in Ref. [32] are 4% higher than those given in Refs [20, 30]. At the Specialists' Meeting on Fast Fission Cross-Sections [31] there was reference to the possibility of a shift in the energy measurement scale in [32] by about 100 keV relative to the data in [33] as being the cause of an error in the data of [32] of about 5% at 1 MeV and of 3% at 6 MeV. However, no conclusion was reached in the discussion.

At an energy of 5.4 MeV, the ^{235}U fission cross-sections of Ref. [18] are approximately 5% lower than those obtained in Refs [32, 33]. The reason for this may be that in Ref. [18] no correction was made for the angular distribution of protons in the (n,p) reaction, which amounts to approximately 2%. In particular, the ratio of the fission cross-section at 14 MeV to the cross-section at 5.4 MeV measured by P. White [18] does not agree with other relative measurements [33, 35]. For this reason, when performing the evaluation the error for this point increased by 5%. In the energy range 2-6 MeV a difference is found in the shape of the curves for I. Szabo's new data [30] and the results of [32, 33].

For the energy range around 14 MeV there are absolute measurements for the fission cross-section: 2.063 ± 0.039 b at 14.6 MeV [36], 2.17 ± 0.04 b and 14.1 MeV [29] and 2.192 ± 0.044 b at 14.8 MeV [37]. The mean-weighted value for these data after extrapolation to 14 MeV is 2.097 b; this agrees within the margins of error with the result in [33], to which the measurements of the ^{235}U fission cross-section for hydrogen in the range 1-20 MeV in Ref. [35] were renormalized.

In the region above 15 MeV the "shapes" of the experimental data show considerable differences, and the accuracy of the fission cross-section may be no more than 10%.

In order to analyse the total errors in the data from the experiments mentioned, use was made of the following types of partial error (Table 3):

- The error entailed in determining the number of ^{235}U nuclei (k = 1);
- The error entailed in extrapolation of the spectrum of fragments to a zero pulse height (k = 2);
- The error associated with absorption of fragments in the foil (k = 3);
- The error associated with scattering in the chamber walls, foil backing and target structure (k = 4);
- The error associated with attenuation of neutrons in the air (k = 5);
- The error involved in determination of neutron flux (k = 6);
- The error associated with the experimental background (k = 7);
- The error associated with the efficiency with which fission is recorded (k = 8);
- The error associated with uncertainty in the geometrical factor (k = 9);
- The error due to the hydrogen cross-section used as a standard (k = 10);
- The statistical error (k = 11);
- The error entailed in normalization (k = 12).

This division of the total error into partial components was made on the basis of information on the errors provided by the authors of the studies evaluated. Where no such information was available (which occurred mainly in the case of older studies), the division was made by analysing experimental methods in terms of the error inherent in them.

Use of the correlations for evaluating the ^{235}U fission cross-section was made possible by analysis of the experimental methods employed for the evaluation of the various studies. The following correlations between the experimental results were found (Table 4).

1. <u>Error entailed in determining the number of ^{235}U nuclei (k = 1)</u>. In studies by I. Szabo [27] (17 keV-1 MeV) and P. White [29] (40 keV-14 MeV) use was made of the same foil, hence these experiments correlate entirely. Another set of results by I. Szabo [28] (17 keV-2.6 MeV) differs from those mentioned above through the use of an additional foil, hence in this case the measurements in [27] and [28] correlate only partially (see Table 4). The data obtained by Szabo in Ref. [30] (2.3 keV-5.5 MeV) do not differ from [27] in any way as far as this type of partial error is concerned, so these data correlate entirely.

We applied two rules in compiling the correlation table. According to Rule 1, if two sets of results correlate independently with a third, they correlate completely with each other. Therefore the data in Ref. [29] correlate completely with those in [30]. This is not at variance with the results obtained by studying this type of partial error from the physical point of view.

The results in Refs [28] and [29], and [28] and [30] may be correlated partially in accordance with Rule 2, which states that if one set of results [23] correlates partially with another [28] but completely with a third [29], the second and third sets ([28] and [29]) must also correlate partially.

The partial correlations shown in Table 4 between the data in Refs [29] and [35-37] with k = 0.3 were transposed to this type of partial error from k = 12 (error in normalization). This is because the cross-sections from [35] were normalized on the mean-weighted value of the data in Refs [29, 36, 37], but they do not have a partial normalization error since they are "absolute". A situation arises in which it is necessary to take into account the correlation between partial errors, i.e. the correlation obtained as a result of normalization needs to be introduced into the coefficients of correlation for all partial errors greater than zero. However, this approach considerably complicates the problem, especially when an additional correlation is needed for the one that is already being made for a given type of partial error. Clearly, in such cases correlations should not be used additively.

As mentioned above, the correlation model applied by the authors of the present paper presupposes the absence of correlation between partial errors, which in most cases is true. In the few cases in which correlation between partial errors is artificially introduced (for example, as a result of normalization), this correlation can be used in the partial error making the greatest contribution to the total error in the experimental results. This approach is not at variance with the model chosen and enables one to make fuller use of the correlations found.

2. Error entailed in extrapolation of the fragment spectrum to a zero pulse height (k = 2). It can be assumed that in Refs [27, 29, 30] the errors entailed in extrapolating the spectrum of fragments to a zero pulse height correlate completely since the same foil was used. In addition, the data in [27] correlate partially with those in [28] because in the latter studies another foil was added to the foil mentioned. According to Rule 2 (see paragraph 1 above), the data of [28] correlate partially with those of [29] and [30] (see Table 4).

3. Error associated with absorption of fragments in the foil (k = 3). Refs [27, 29, 30] correlate entirely and [27, 28] partially. This is because in all three experiments the same foil was used, with the addition of another foil in Ref. [28]. For drawing up the table of correlations the same rules were applied as before (see paragraph 1 above).

4. Error associated with scattering in the chamber walls, foil backing and target structure (k = 4). In the studies by I. Szabo [27] (17 keV–1 MeV) and P. White [29] (40 keV–14 MeV) the same fission chamber was used, so these experimental results correlate entirely. From the information available it might have been assumed that the same chamber was used for Ref. [30] as for Ref. [29]. Since, however, this is known not to be the case, we shall assign partial correlation to the data in Refs [29] and [30]. In this case the data of [27] also correlate partially with those of [30].

5. Error associated with attenuation of neutrons in the air (k = 5). No correlations have been found in this type of partial error.

6. Error in determination of neutron flux (k = 6). The results in Refs [4–6, 11, 14, 15, 19, 22] intercorrelate completely, since in all of them a chamber with ^{10}B was used for determining neutron flux. In the experiment described in Ref. [24] the neutron flux was determined using

chambers with both ^{10}B and ^{6}Li at the same time. For this reason the data given above must correlate partially with the results in [24].

In another set of studies [7, 8, 17, 18, 20] ^{6}Li was used for the determination of neutron flux, hence these experiments correlate completely with each other and partially with the data in [24]. We assume that the group of results using ^{10}B and ^{6}Li do not correlate.

In a third set of studies [25, 29, 35] neutron flux was determined by ^{2}H. These experiments correlate entirely. In addition, in Ref. [27] two further methods were used for determining neutron flux in addition to the proton recoil method: the magnesium-sulphate bath method and the associated particle technique. This causes the data in [27] to correlate partially with those in [26, 29, 35].

The method used for determination of neutron flux in Refs [28, 30] was the same, and thus they correlate entirely. Two of the three methods used in these experiments for determining neutron flux (the magnesium-sulphate bath and associated-particle methods) are the same as those used in Ref. [27]. It can therefore be assumed that the data of [27] correlate with those of [28, 30] with a coefficient $K_{6,13,14} = K_{6,13,24} = 0.7$.

7. Error associated with the background of the experiment (k = 7). No correlations for this type of partial error were found.

8. Error associated with the efficiency with which fission is recorded (k = 8). No correlations were found.

9. Error associated with uncertainty in the geometrical factor (k = 9). No correlations were found.

10. Error due to the hydrogen cross-section used as a standard (k = 10). In Refs [25, 27, 29, 32-35, 39] the hydrogen cross-section was used as a standard. These results intercorrelate completely.

11. Statistical error (k = 11). There are no correlations.

12. Error in normalization (k = 12). The results in [4, 7, 8, 11] were renormalized to the fission integral in the energy region 0.1-1.0 keV and on the thermal value (see Tables 1 and 2). Errors in normalization of these values correlate completely. The experimental measurements in [17, 18] are absolute and correlate entirely, since they were normalized on the same

fission integral (from 0.1-1.0 keV). Relative measurements were performed in Refs [6, 14, 15, 19, 20, 22]. These data were also normalized on the fission integral from 0.1-1.0 keV and consequently correlate entirely. Above 10 keV the data from Ref. [24] were renormalized to the values in Ref. [11] for the region 2-10 keV. The results in [11] were also normalized to the fission integral in the range 0.1-1.0 keV. Thus the data in [24] correlate entirely with all the experiments mentioned. The results in [5, 25] were renormalized to the integral for 10-30 keV, which was obtained from the data in Refs [4, 7]. It follows from this that the results of [5, 25] are in the final analysis also normalized on the integral for 0.1-1.0 keV and the thermal value. As a result of this normalization, full correlation is found between Refs [4, 5, 7, 8, 11, 14, 15, 17-20, 22, 24, 25]. In addition, the experimental results in [26] correlate completely with those in Ref. [33], since the latter are normalized to the data in [26].

As mentioned above (see k = 1), correlations between [35] and the experimental data of [29, 36, 37] were transposed to k = 1. The correlation in this case occurs because the data of [35] were renormalized by the authors of the present article to a mean-weighted value [29, 36, 37]. This correlation with coefficients $K_{12,29,39} = K_{12,35,36} = K_{12,35,37} = 0.3$ can also be left for k = 12, since this partial error (the error in normalization for the "absolute" data of [29, 36, 37]) is equal to zero.

Calculations of optimized weights performed using the computer program for the cases: absence of correlation (K = 0), assigned correlation (K) and total correlation (K = 1) between the partial errors in experimental data for all the energy ranges examined are given in Annex 1, which also shows experimental ^{235}U fission cross-sections for which normalizations have been used.

Annex 2 contains calculated coefficients of correlation between energy ranges for the cases: absence of correlation, assigned correlation and total correlation between errors.

Table 5 shows evaluated ^{235}U fission cross-sections and errors in evaluation both using and not using correlations for optimum weights. The errors in the evaluated curve shown for energies above 30 keV are average values for the ranges considered.

When using non-optimized weights, which are the inverse squares of the error, the error in the evaluated ^{235}U fission cross-section for assigned correlations in the region up to 100 keV is on average 10% greater than the errors shown in Table 5, while in the region up to 14 MeV it is 5% greater.

The error values given in Table 5 are of a tentative nature. In the region of 30 keV, where ranges are small, errors amount to 3-4%, which may be considered equivalent to the accuracy that can be attained experimentally. Above 30 keV the ranges are wide, with the result that many sets of results are evaluated for them and there may be incorrect evaluation of the error as a result of an uneven distribution of the experimental points given in individual studies within a range. Thus, errors for the region above 30 keV are of an illustrative character; they are, however, in process of being worked out more precisely. Nevertheless, in the region 30 keV-15 MeV the accuracy achieved may be ± 3%.

A comparison of the results of the evaluation with ENDF/B-V data (Figs 1-3) shows that they agree to within 1-3% in the energy region 0.1 keV-15 MeV.

For the measurements to be performed in the future, it will be necessary to consider the ranges 0.25-0.7 and 14-20 MeV in order to clarify the discrepancies found in experimental data for those ranges.

Table 1

Fission integrals I_f for ^{235}U

Ref.	$^{2200}\sigma_f$, b (obtained using the least squares method in Ref. [1])	$I_f = \int_{7.8 eV}^{11 eV} \sigma_f dE$, b•eV (experimental data)	$I_f = \int_{7.8 eV}^{11 eV} \sigma_f dE$, b•eV (renormalized to $^{2200}\sigma_f$ = 583,5 b)	Were data from the evaluation of Ref. [1] used?
/4/	580,05 ± 2,0	234,62	235,90 ± 3,54	Yes
/7/	585,0 ± 2,6	242,27	240,60 ± 2,40	Yes
/8/	–	238,40	–	No Relative data were obtained by normalizing to data from Ref. [1]
/10/	569,8 ± 2,3	237,35	243,06 ± 2,40	Yes
/11/	574,1 ± 2,3	237,40	241,30 ± 4.80	Yes
/12/	569,9 ± 2,0	246,02	251,91 ± 7,56	Because of the considerable deviation from other data, the weight was reduced three-fold
/13/	577,3 ± 1,8	229,38	231,85*/	No, because data were obtained for the region up to 10 eV
/14/	591,4 ± 2,6	232,80	229,70	No, because of the large difference in the shape of the curve from that of the curve found using other data
/15/	537,1 ± 5,9	217,51	236,30	See [14] above
/16/	–	240,0	–	See [14] above

*/ Obtained from the mean ratio of the fission integral for 7.8-11 eV to the fission integral for 7.4-10 eV, which is equal to 1.07533.

Fission integrals for ^{235}U in the range 0.1-1.0 keV

Table 2

Measurements	Ref.	$I_1 = \int_{0,1 keV}^{1,0 keV} \sigma_f dE$, b•eV		Coefficient of renormalization		Renormalized I_1, b•eV
		Experimental data	Data corrected for ^{10}B or ^{6}Li			
Absolute	/11/	12300 ± 492	12203 ± 488	1,016175	to I_f = 241,24 ± 6,75 /1/	12400 ± 607
	/7/	11490 ± 229	11451,7 ±286	0,995748		11403 ± 428
	/4/	11778 ± 235	11475,2 ± 286	1,028215		11799 ± 442
	/8/	(10380)*/	(10410)*/	(1,011912)		(10534)^x
		11641,8 ± 233	11675,4 ± 292	1,011912		11815 ± 473
	/16/	12287	12141,3 ± 303	1,005166		12204 ± 458
						11864 (mean-weighted)
	/17/	11866 ± 949	11782 ± 940	Not renormalized		
	/18/	12490 ± 999	12400 ± 990	"		
						11883±446 (mean-weighted data of [4,7,8,11, 16-18])
Relative	/10/	12212 ± 733	12115 ± 727	0,980850	to I_1 = 11883±446	
	/19/	12377 ± 495	12333 ± 493	0,963512		
	/20/	12715 ± 890	12625 ± 885	0,941227		
	/21/	12405 ± 1240	12240 ± 1224	0,970833		
	/15/	11866 ± 1187	11688 ± 1187	1,016683		
	/22/	12377 ± 495	12332 ± 495	0,963590		
	/6/	12260 ± 680	12216 ± 670	0,972740		

*/ The fission integral I_2 was calculated for the ranges 0.1-0.3 and 0.4-1 keV; I_1 was obtained from the ratio I_1/I_2, which is equal to 1.12156.

Partial and total errors in experimental data for different energy ranges (in percent)

Table 3

Energy range	Ref.	Partial errors												Total error
		k = 1	*k* =2	*k* =3	*k* =4	*k* =5	*k* =6	*k* =7	*k* =8	*k* =9	*k* =10	*k* =11	*k* =12	
0,1–0,3 keV (0,15 keV)*/	/11/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,2	0,2	0,0	2,0	2,8	4,31
	/19/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,0	0,2	0,0	1,0	3,8	4,71
	/17/	1,5	0,5	0,3	2,0	0,3	3,0	3,0	3,0	1,0	0,0	3,0	2,8	7,18
	/14/	1,5	0,5	0,3	1,0	0,3	2,5	2,0	0,0	1,0	0,0	4,0	3,8	6,74
	/18/	1,5	0,5	0,3	2,0	0,3	5,0	3,0	3,0	1,0	0,0	3,0	2,8	8,22
	/20/	1,5	0,5	0,3	1,0	0,3	3,5	3,0	0,0	0,5	0,0	3,0	3,8	6,97
	/15/	1,5	0,5	0,3	3,0	0,3	2,5	4,0	0,0	1,0	0,0	4,0	3,8	8,09
	/22/	0,5	0,5	0,3	1,0	0,3	1,8	0,5	0,0	0,2	0,0	2,0	3,8	4,86
	/4/	0,5	0,5	0,3	1,0	0,3	1,5	0,5	0,0	0,2	0,0	2,0	3,8	4,75
	/6/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	3,0	0,2	0,0	1,0	3,8	5,56
	/7/	0,5	0,3	0,5	0,7	0,3	1,5	0,3	0,4	0,0	0,0	0,6	2,8	3,45
	/8/	0,5	0,3	0,2	0,3	0,2	0,1	0,2	0,3	0,0	1,3	0,87	2,8	3,31
0,3–0,4 keV (0,15 keV)	/11/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,2	0,2	0,0	2,0	2,8	4,31
	/19/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,0	0,2	0,0	1,0	3,8	4,71
	/17/	1,5	0,5	0,3	2,0	0,3	3,0	3,0	3,0	1,0	0,0	3,0	2,8	7,18
	/14/	1,5	0,5	0,3	1,0	0,3	2,5	2,0	0,0	1,0	0,0	4,0	3,8	6,74
	/18/	1,5	0,5	0,3	2,0	0,3	5,0	3,0	3,0	1,0	0,0	3,0	2,8	8,22
	/20/	1,5	0,5	0,3	1,0	0,3	3,5	3,0	0,0	0,5	0,0	3,0	3,8	6,97
	/15/	1,5	0,5	0,3	3,0	0,3	2,5	4,0	0,0	1,0	0,0	4,0	3,8	8,09
	/22/	0,5	0,5	0,3	1,0	0,3	1,8	0,5	0,0	0,2	0,0	2,0	3,8	4,86
	/4/	0,5	0,5	0,3	1,0	0,3	1,5	0,5	2,0	0,2	0,0	2,0	2,8	4,48
	/7/	0,5	0,3	0,5	0,7	0,3	1,5	0,3	0,4	0,0	0,0	0,6	2,8	3,45
0,4–0,6 keV (0,65 keV)	/11/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,2	0,2	0,0	2,0	2,8	4,31
	/19/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,0	0,2	0,0	1,0	3,8	4,71
	/17/	1,5	0,5	0,3	2,0	0,3	3,0	3,0	3,0	1,0	0,0	3,0	2,8	7,18
	/14/	1,5	0,5	0,3	1,0	0,3	2,5	2,0	0,0	1,0	0,0	4,0	3,8	6,74
	/18/	1,5	0,5	0,3	2,0	0,3	5,0	3,0	3,0	1,0	0,0	3,0	2,8	8,22
	/20/	1,5	0,5	0,3	1,0	0,3	3,5	3,0	0,0	0,5	0,0	3,0	3,8	6,97
	/15/	1,5	0,5	0,3	3,0	0,3	2,5	4,0	0,0	1,0	0,0	4,0	3,8	8,09
	/22/	0,5	0,5	0,3	1,0	0,3	1,8	0,5	0,0	0,2	0,0	2,0	3,8	4,86
	/4/	0,5	0,5	0,3	1,0	0,3	1,5	0,5	2,0	0,2	0,0	2,0	2,8	4,48
	/7/	0,5	0,3	0,5	0,7	0,3	1,5	0,5	0,4	0,0	0,0	0,6	2,8	3,45
	/8/	0,5	0,3	0,2	0,3	0,2	0,7	0,2	0,3	0,0	1,3	1,55	2,8	3,61

*/ The energies at which errors assigned below to the whole energy range were taken are shown in brackets.

Table 3 (cont.)

Energy range	Ref.	Partial errors												Total error
		$k=1$	$k=2$	$k=3$	$k=4$	$k=5$	$k=6$	$k=7$	$k=8$	$k=9$	$k=10$	$k=11$	$k=12$	
0,6–0,8 keV (0,65 keV)	/11/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,2	0,2	0,0	2,0	2,8	4,31
	/19/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,0	0,2	0,0	1,0	3,8	4,71
	/17/	1,5	0,5	0,3	2,0	0,3	3,0	3,0	3,0	1,0	0,0	3,0	2,8	7,18
	/14/	1,5	0,5	0,3	1,0	0,3	2,5	2,0	0,0	1,0	0,0	4,0	3,8	6,74
	/18/	1,5	0,5	0,3	2,0	0,3	4,0	3,0	3,0	1,0	0,0	3,0	2,8	7,65
	/20/	1,3	0,5	0,3	1,0	0,3	3,5	3,0	0,0	0,5	0,0	3,0	3,8	6,97
	/15/	1,5	0,5	0,3	3,0	0,3	2,5	4,0	0,0	1,0	0,0	4,0	3,8	8,09
	/22/	0,5	0,5	0,3	1,0	0,3	1,8	0,5	0,0	0,2	0,0	2,0	3,8	4,86
	/4/	0,5	0,5	0,3	1,0	0,3	1,5	0,5	2,0	0,2	0,0	2,0	2,8	4,48
0,8–1,0 keV (1,5 keV)	/11/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,2	0,2	0,0	2,0	2,8	4,31
	/19/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,0	0,2	0,0	1,0	3,8	4,71
	/17/	1,5	0,5	0,3	2,0	0,3	3,0	3,0	3,0	1,0	0,0	4,0	2,8	7,65
	/14/	1,5	0,5	0,3	1,0	0,3	2,5	2,0	0,0	1,0	0,0	4,0	3,8	6,74
	/18/	1,5	0,5	0,3	1,5	0,3	4,0	3,0	3,0	1,0	0,0	4,0	2,8	7,99
	/20/	1,5	0,5	0,3	1,0	0,3	4,0	3,0	0,0	0,5	0,0	3,0	3,8	7,24
	/15/	1,5	0,5	0,3	3,0	0,3	2,5	4,0	0,0	1,0	0,0	5,0	3,8	8,62
	/22/	0,5	0,5	0,3	1,0	0,3	2,6	0,5	0,0	0,2	0,0	2,0	3,8	5,21
	/4/	0,5	0,5	0,3	1,0	0,3	1,5	0,5	2,0	0,2	0,0	2,0	2,8	4,48
1–2 keV (1,5 keV)	/11/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,2	0,2	0,0	2,0	2,8	4,31
	/19/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,0	0,2	0,0	1,0	3,8	4,71
	/17/	1,5	0,5	0,3	2,0	0,3	3,0	3,0	3,0	1,0	0,0	4,0	2,8	7,65
	/14/	1,5	0,5	0,3	1,0	0,3	2,5	2,0	0,0	1,0	0,0	4,0	3,8	6,74
	/18/	1,5	0,5	0,3	1,5	0,3	4,0	3,0	3,0	1,0	0,0	4,0	2,8	7,99
	/20/	1,5	0,5	0,3	1,0	0,3	4,0	3,0	0,0	0,5	0,0	3,0	3,8	7,24
	/15/	1,5	0,5	0,3	3,0	0,3	2,5	4,0	0,0	1,0	0,0	5,0	3,8	8,62
	/22/	0,5	0,5	0,3	1,0	0,3	2,6	0,5	0,0	0,2	0,0	2,0	3,8	5,21
	/4/	0,5	0,5	0,3	1,0	0,3	1,5	0,5	2,0	0,2	0,0	2,0	2,8	4,48
	/5/	1,0	0,5	0,3	1,0	0,3	3,6	0,5	0,5	0,2	0,0	0,5	5,0	6,42
	/6/	1,0	0,5	0,3	1,0	0,3	2,6	0,5	3,0	0,2	0,0	1,0	3,8	5,82
	/7/	0,5	0,3	0,5	0,7	0,3	1,5	0,3	0,4	0,0	0,0	0,7	2,8	3,46
	/8/	0,5	0,3	0,2	0,4	0,2	1,0	0,2	0,3	0,0	1,3	0,86	2,8	3,47
2–4 keV (1,5 keV)	/11/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,2	0,2	0,0	2,0	2,8	4,31
	/19/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,0	0,2	0,0	1,0	3,8	4,71
	/17/	1,5	0,5	0,3	2,0	0,3	3,0	3,0	3,0	1,0	0,0	4,0	2,8	7,65
	/14/	1,5	0,5	0,3	1,0	0,3	2,5	2,0	0,0	1,0	0,0	4,0	3,8	6,74
	/18/	1,5	0,5	0,3	1,5	0,3	4,0	3,0	3,0	1,0	0,0	4,0	2,8	7,99
	/20/	1,5	0,5	0,3	1,0	0,3	4,0	3,0	0,0	0,5	0,0	3,0	3,8	7,24
	/15/	1,5	0,5	0,3	1,0	0,3	4,0	3,0	0,0	0,5	0,0	3,0	3,8	7,24
	/22/	0,5	0,5	0,3	1,0	0,3	2,6	0,5	0,0	0,2	0,0	2,0	3,8	5,21
	/24/	0,5	0,5	0,3	1,0	0,3	3,6	0,5	4,0	0,2	0,0	0,3	4,31	7,04
	/4/	0,5	0,5	0,3	1,0	0,3	1,5	0,5	2,0	0,2	0,0	2,0	2,8	4,48
	/5/	1,0	0,5	0,3	1,0	0,3	3,6	0,5	0,5	0,2	0,0	0,5	5,0	6,42
	/6/	1,0	0,5	0,3	1,0	0,3	2,6	0,5	3,0	0,2	0,0	1,0	3,8	5,82

Table 3 (cont.)

Energy range	Ref.	Partial errors												Total error
		$k=1$	$k=2$	$k=3$	$k=4$	$k=5$	$k=6$	$k=7$	$k=8$	$k=9$	$k=10$	$k=11$	$k=12$	
4–5 keV (1,5 keV)	/11/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,2	0,2	0,0	2,0	2,8	4,31
	/19/	1,0	0,5	0,3	1,0	0,3	2,0	0,5	0,0	0,2	0,0	1,0	3,8	4,71
	/17/	1,5	0,5	0,3	2,0	0,3	3,0	3,0	3,0	1,0	0,0	4,0	2,8	7,65
	/14/	1,5	0,5	0,3	1,0	0,3	2,5	2,0	0,0	1,0	0,0	4,0	3,8	6,74
	/18/	1,5	0,5	0,3	1,0	0,3	4,0	3,0	3,0	1,0	0,0	4,0	2,8	7,91
	/20/	1,5	0,5	0,3	1,0	0,3	4,0	3,0	0,0	0,5	0,0	3,0	3,8	7,24
	/15/	1,5	0,5	0,3	3,0	0,3	2,5	4,0	0,0	1,0	0,0	5,0	3,8	8,62
	/22/	0,5	0,5	0,3	1,0	0,3	2,6	0,5	0,0	0,2	0,0	2,0	3,8	5,21
	/24/	0,5	0,5	0,3	1,0	0,3	3,6	0,5	4,0	0,2	0,0	0,3	4,31	7,04
	/4/	0,5	0,5	0,3	1,0	0,3	1,5	0,5	2,0	0,2	0,0	2,0	2,8	4,48
	/5/	1,0	0,5	0,3	1,0	0,3	3,6	0,5	0,5	0,2	0,0	0,5	5,0	6,42
	/6/	1,0	0,5	0,3	1,0	0,3	2,6	0,5	3,0	0,2	0,0	1,0	3,8	5,82
	/8/	0,5	0,3	0,2	0,5	0,2	1,0	0,2	0,3	0,0	1,3	1,77	2,8	3,80
5–10 keV (9,5 keV)	/11/	1,0	0,5	0,3	1,5	0,3	2,5	0,5	0,2	0,2	0,0	2,0	2,8	4,70
	/19/	1,0	0,5	0,3	1,5	0,3	2,5	0,5	0,0	0,2	0,0	2,0	3,8	5,35
	/17/	1,5	0,5	0,3	2,0	0,3	3,5	3,0	3,0	1,0	0,0	4,0	2,8	7,85
	/14/	1,5	0,5	0,3	1,5	0,3	3,0	2,0	0,0	1,0	0,0	5,0	3,8	7,64
	/18/	1,5	0,5	0,3	2,0	0,3	5,0	3,0	3,0	1,0	0,0	4,0	2,8	8,63
	/20/	1,5	0,5	0,3	1,5	0,3	4,0	3,0	0,0	0,5	0,0	3,0	3,8	7,32
	/15/	1,5	0,5	0,3	5,0	0,3	3,0	4,0	0,0	1,0	0,0	5,0	3,8	9,85
	/22/	0,5	0,5	0,3	1,0	0,3	2,6	0,5	0,0	0,2	0,0	2,0	3,8	5,21
	/24/	0,5	0,5	0,3	1,0	0,3	3,6	0,5	4,0	0,2	0,0	0,8	4,31	7,08
	/4/	0,5	0,5	0,3	1,0	0,3	2,0	0,5	2,0	0,2	0,0	2,0	2,8	4,67
	/5/	1,0	0,5	0,3	1,0	0,3	2,8	0,5	0,5	0,2	0,0	0,5	5,0	6,00
	/6/	1,0	0,5	0,3	1,0	0,3	2,6	0,5	3,0	0,2	0,0	1,0	3,8	5,82
	/25/	0,5	0,3	0,2	0,5	0,2	1,3	0,2	0,3	0,0	0,75	1,01	5,0	5,39
10–20 keV (25 keV)	/19/	1,0	0,5	0,3	2,0	0,3	3,0	2,9	0,0	0,2	0,0	3,0	3,8	6,81
	/17/	1,5	0,5	0,3	2,0	0,3	4,0	3,0	3,0	1,0	0,0	4,0	2,8	8,09
	/20/	1,5	0,5	0,3	2,0	0,3	4,0	3,0	0,0	0,5	0,0	3,0	3,8	7,44
	/24/	0,5	0,5	0,3	1,0	0,3	4,2	0,5	4,0	0,2	0,0	0,4	4,31	7,37
	/4/	0,5	0,5	0,3	1,5	0,3	2,5	0,5	2,0	0,2	0,0	2,0	2,8	5,03
	/5/	1,0	0,5	0,3	1,0	0,3	2,8	0,5	0,5	0,2	0,0	0,5	5,0	6,00
	/7/	0,5	0,3	0,5	0,9	0,3	2,0	0,3	0,4	0,0	0,0	1,0	2,8	3,82
	/25/	0,5	0,3	0,2	0,2	0,2	1,1	0,2	0,3	0,0	0,75	0,4	5,0	5,25
20–30 keV (25 keV)	/19/	1,0	0,5	0,3	2,0	0,3	3,0	2,9	0,0	0,2	0,0	3,0	3,8	6,81
	/17/	1,5	0,5	0,3	2,0	0,3	4,0	3,0	3,0	1,0	0,0	4,0	2,8	8,09
	/20/	1,5	0,5	0,3	2,0	0,3	4,0	3,0	0,0	0,5	0,0	3,0	3,8	7,44
	/24/	1,5	0,5	0,3	1,0	0,3	4,2	0,5	4,0	0,2	0,0	0,4	3,8	7,23
	/4/	0,5	0,5	0,3	1,5	0,3	2,5	0,5	2,0	0,2	0,0	2,0	2,8	5,03
	/5/	1,0	0,5	0,3	1,0	0,3	2,8	0,5	0,5	0,2	0,0	0,5	5,0	6,00
	/7/	1,5	0,3	0,5	0,9	0,3	2,0	0,3	0,4	0,0	0,0	1,0	2,8	4,07
	/25/	0,5	0,3	0,2	0,2	0,2	1,1	0,2	0,3	0,0	0,75	0,95	5,0	5,32

Table 3 (cont.)

Energy range	Ref.	Partial errors												Total error
		$k=1$	$k=2$	$k=3$	$k=4$	$k=5$	$k=6$	$k=7$	$k=8$	$k=9$	$k=10$	$k=11$	$k=12$	
30-110 keV (75 keV)	[17]	1,5	0,5	0,3	2,0	0,3	4,0	3,0	3,0	1,0	0,0	4,0	2,8	8,09
	[24]	0,5	0,5	0,3	1,0	0,3	5,0	0,5	4,0	0,2	0,0	0,9	4,31	7,90
	[4]	0,5	0,5	0,3	2,0	0,3	4,0	0,5	2,0	0,2	0,0	2,0	2,8	6,07
	[5]	1,0	0,5	0,2	1,0	0,3	2,8	0,5	0,5	0,2	0,0	0,5	5,0	6,00
	[27]	1,3	0,5	0,7	1,3	0,5	1,8	0,7	0,2	0,2	0,3	1,31	0,0	3,16
	[28]	1,0	0,3	0,4	0,5	0,5	1,8	0,4	0,2	0,3	0,0	1,42	0,0	2,70
	[29]	1,0	0,5	0,5	0,9	0,3	2,0	0,2	0,0	0,2	0,75	1,05	0,0	2,85
	[26]	0,5	0,5	0,5	0,8	0,8	1,4	0,5	0,9	0,8	0,0	1,82	0,0	3,00
	[7]	0,5	0,3	0,5	0,5	0,3	3,5	0,3	0,4	0,0	0,0	1,3	2,8	4,79
	[25]	0,5	0,3	0,2	0,3	0,2	1,0	0,2	0,3	0,0	0,75	1,18	5,0	5,35
110-350 keV (200 keV)	[ ]	0,5	0,5	0,3	2,0	0,3	4,5	0,5	2,0	0,2	0,0	2,0	2,8	6,41
	[5]	1,0	0,5	0,3	1,0	0,3	3,1	0,5	0,5	0,2	0,0	0,5	5,0	6,15
	[27]	1,3	0,5	0,7	1,0	0,5	1,8	0,7	0,2	0,2	0,3	2,9	0,0	4,00
	[28]	1,0	0,3	0,4	0,5	0,5	1,8	0,4	0,2	0,3	0,0	1,42	0,0	2,70
	[29]	1,0	0,5	0,5	0,6	0,3	1,7	0,0	0,0	0,2	0,75	1,11	0,0	2,59
	[26]	0,5	0,5	0,5	0,8	0,8	1,4	0,5	0,9	0,8	0,0	1,85	0,0	3,02
	[7]	0,5	0,3	0,5	0,5	0,3	5,0	0,3	0,4	0,0	0,0	4,1	2,8	7,13
	[25]	0,5	0,3	0,2	0,2	0,2	0,5	0,2	0,3	0,0	0,75	0,81	5,0	5,20
	[38]	0,5	0,0	0,3	0,5	0,0	0,5	1,0	0,37	0,5	0,0	1,37	0,0	2,03
350-750 keV (500 keV)	[5]	1,0	0,5	0,3	1,0	0,3	3,3	0,5	0,5	0,2	0,0	0,5	5,0	6,25
	[27]	1,3	0,5	0,7	1,0	0,5	1,8	0,7	0,2	0,2	0,3	0,3	0,0	2,77
	[28]	1,0	0,3	0,4	0,5	0,5	1,8	0,4	0,2	0,3	0,0	1,82	0,0	2,93
	[29]	1,0	0,5	0,5	0,6	0,8	1,84	0,2	0,0	0,2	0,75	0,95	0,0	2,62
	[26]	0,5	0,5	0,5	0,8	0,8	1,4	0,5	0,9	0,8	0,0	1,82	0,0	3,00
	[34]	0,4	0,3	0,5	1,6	0,3	2,4	0,5	0,8	0,2	0,75	1,21	0,0	3,44
	[39]	1,0	0,3	1,1	0,5	0,3	6,62	0,2	0,0	0,0	0,75	1,5	0,0	7,02
	[7]	0,5	0,3	0,5	0,6	0,3	8,0	0,3	0,4	0,0	0,0	2,2	2,8	8,85
	[25]	0,5	0,3	0,2	0,1	0,2	1,2	0,2	0,3	0,0	0,75	0,9	5,0	5,35
0,75-1,5 MeV (1 MeV)	[5]	1,0	0,5	0,3	1,0	0,3	3,4	0,5	0,5	0,2	0,0	0,5	5,0	6,31
	[27]	1,3	0,5	0,7	1,0	0,5	1,8	0,7	0,2	0,2	0,3	0,86	0,0	2,88
	[28]	1,0	0,3	0,4	0,5	1,8	0,4	0,2	0,3	0,3	0,0	1,82	0,0	2,90
	[29]	1,0	0,5	0,5	0,6	0,3	1,89	0,2	0,0	0,2	0,8	0,42	0,0	2,52
	[26]	0,5	0,5	0,5	0,8	0,8	1,4	0,5	0,9	0,8	0,0	1,82	0,0	3,00
	[34]	0,4	0,3	0,5	1,1	0,3	2,2	0,5	0,8	0,2	0,75	1,1	0,0	3,05
	[39]	1,0	0,3	1,1	0,5	0,3	6,62	0,2	0,0	0,0	0,75	1,5	0,0	7,02
	[32]	0,5	0,3	0,2	0,6	0,2	0,32	0,3	0,3	0,0	0,75	0,9	0,0	1,56
	[33]	0,0	0,0	0,0	0,2	0,0	0,3	0,1	0,4	0,0	0,5	0,8	3,0	3,19
	[25]	0,5	0,3	0,2	0,1	0,2	1,8	0,2	0,3	0,0	0,75	1,0	5,0	5,51
	[38]	0,5	0,0	0,3	0,5	0,0	0,5	1,0	0,58	0,5	0,0	1,37	0,0	2,07
	[35]	2,25	0,5	0,3	1,0	0,2	7,0	0,0	2,0	0,2	2,0	2,0	0,0	8,21

Table 3 (concluded)

Energy range	Ref.	Partial errors												Total error
		k =1	*k* =2	*k* =3	*k* =4	*k* =5	*k* =6	*k* =7	*k* =8	*k* =9	*k* =10	*k* =11	*k* =12	
I,5–3.0 MeV (2 MeV)	/28/	1,0	0,3	0,4	0,5	0,5	1,8	0,4	0,2	0,3	0,0	0,55	0,0	2,36
	/29/	1,0	0,5	0,5	0,7	0,3	2,5	0,2	0,0	0,2	0,75	1,02	0,0	3,16
	/26/	0,5	0,5	0,5	0,8	0,8	1,4	0,5	0,9	0,8	0,0	1,82	0,0	3,00
	/39/	1,0	0,3	1,1	0,5	0,3	6,62	0,2	0,0	0,0	0,75	1,5	0,0	7,02
	/32/	0,5	0,3	0,2	0,45	0,2	0,32	0,3	0,3	0,0	0,75	0,5	0,0	1,31
	/33/	0,0	0,0	0,0	0,2	0,0	0,3	0,1	0,4	0,0	0,5	1,0	3,0	3,25
	/30/	1,0	0,3	0,4	0,5	0,5	1,84	2,6	0,2	0,3	0,0	0,55	0,0	3,51
	/35/	2,25	0,5	0,3	1,0	0,2	5,0	0,0	2,0	0,2	2,0	2,0	0,0	6,59
3–5 MeV (4 MeV)	/26/	0,5	0,5	0,5	0,8	0,8	1,4	0,5	0,9	0,8	0,0	1,82	0,0	3,00
	/32/	0,5	0,3	0,2	0,6	0,2	0,32	0,3	0,3	0,0	0,75	1,2	0,0	1,75
	/33/	0,0	0,0	0,0	0,2	0,0	0,3	0,1	0,4	0,0	0,5	1,0	3,0	3,25
	/30/	1,0	0,3	0,4	0,5	0,5	2,0I	2,85	0,2	0,3	0,0	0,55	0,0	3,79
	/35/	2,25	0,5	0,3	1,0	0,2	4,0	0,0	2,0	0,2	2,0	2,0	0,0	5,87
5–I2 MeV (6 MeV)	/29/	1,0	0,5	0,5	0,8	0,3	2,5	0,2	0,0	0,2	0,75	1,02	0,0	3,19
	/32/	0,5	0,3	0,2	0,6	0,2	0,32	0,3	0,3	0,0	0,75	1,2	0,0	1,75
	/33/	0,0	0,0	0,0	0,2	0,0	0,3	0,1	0,4	0,0	0,5	1,0	3,0	3,25
	/30/	1,0	0,3	0,4	0,5	0,5	2,02	2,86	0,2	0,3	0,0	0,55	0,0	3,80
	/35/	2,25	0,5	0,3	1,0	0,2	4,0	0,0	2,0	0,2	2,0	2,0	0,0	5,87
I2–I4 MeV (14 MeV)	/29/	1,0	0,5	0,5	1,0	0,3	1,5	0,2	0,0	0,2	0,75	0,2	0,0	2,35
	/33/	0,0	0,0	0,0	0,2	0,0	0,3	0,1	0,4	0,0	0,5	1,0	3,0	3,25
	/36/	1,4	0,6	0,47	0,0	0,0	0,48	0,0	0,2	0,0	0,0	0,9	0,0	1,90
	/37/	1,19	0,4	0,3	0,0	0,0	1,0	0,2	0,2	0,2	0,0	1,11	0,0	2,00
	/35/	2,25	0,5	0,3	1,0	0,2	4,0	0,0	2,0	0,2	2,0	2,0	0,0	5,87
I4,I–I5 MeV (14 MeV)	/29/	1,0	0,5	0,5	1,0	0,3	1,5	0,2	0,0	0,2	0,75	0,2	0,0	2,35
	/36/	1,4	0,6	0,47	0,0	0,0	0,48	0,0	0,2	0,0	0,0	0,9	0,0	1,90
	/37/	1,19	0,4	0,3	0,0	0,0	1,0	0,2	0,2	0,2	0,0	1,11	0,0	2,00
I5–20 MeV (14 MeV)	/33/	0,0	0,0	0,0	0,4	0,0	0,5	0,1	0,4	0,0	0,5	1,9	3,0	3,67
	/35/	2,25	0,5	0,3	1,0	0,2	8,0	0,0	2,0	0,2	2,0	2,0	0,0	9,08

Table 4

Coefficients of correlation $K_{k,i,j}$ between partial errors in experimental measurements of the ^{235}U cross-section

$K_{1,27,28}=0,5$
$K_{1,27,29}=1,0$
$K_{1,27,30}=1,0$
$K_{1,28,29}=0,5$
$K_{1,28,30}=0,5$
$K_{1,29,35}=0,3$
$K_{1,29,30}=1,0$
$K_{1,36,35}=0,3$
$K_{1,37,26}=0,3$
$K_{3,27,28}=0,5$
$K_{3,27,29}=1,0$
$K_{3,27,30}=1,0$
$K_{3,28,29}=0,5$
$K_{3,28,30}=0,5$
$K_{3,29,30}=1,0$
$K_{4,27,30}=0,5$
$K_{4,29,30}=0,5$
$K_{6,4,5}=1,0$
$K_{6,4,6}=1,0$
$K_{6,5,6}=1,0$
$K_{6,7,8}=1,0$
$K_{6,11,4}=1,0$
$K_{6,11,5}=1,0$
$K_{6,11,6}=1,0$
$K_{6,11,14}=1,0$
$K_{6,11,15}=1,0$
$K_{6,11,19}=1,0$
$K_{6,11,22}=1,0$
$K_{6,11,24}=0,5$
$K_{6,14,4}=1,0$
$K_{6,14,5}=1,0$
$K_{6,14,6}=1,0$
$K_{6,14,15}=1,0$
$K_{6,14,22}=1,0$
$K_{6,14,24}=1,0$
$K_{6,15,4}=1,0$
$K_{6,15,5}=1,0$
$K_{6,15,6}=1,0$
$K_{6,15,22}=1,0$
$K_{6,15,24}=0,5$
$K_{6,17,7}=1,0$
$K_{6,17,8}=1,0$
$K_{6,17,18}=1,0$
$K_{6,17,20}=1,0$
$K_{6,17,24}=0,5$
$K_{6,18,7}=1,0$
$K_{6,18,8}=1,0$
$K_{6,18,20}=1,0$
$K_{6,18,24}=0,5$
$K_{6,19,4}=1,0$
$K_{6,19,5}=1,0$
$K_{6,19,6}=1,0$
$K_{6,19,14}=1,0$
$K_{6,19,15}=1,0$
$K_{6,19,22}=1,0$
$K_{6,19,24}=0,5$
$K_{6,20,7}=1,0$
$K_{6,20,8}=1,0$
$K_{6,20,24}=0,5$
$K_{6,22,4}=1,0$
$K_{6,22,5}=1,0$
$K_{6,22,6}=1,0$
$K_{6,22,24}=0,5$
$K_{6,24,4}=0,5$
$K_{6,24,5}=0,5$
$K_{6,24,6}=0,5$
$K_{6,24,7}=0,5$
$K_{6,24,8}=0,5$
$K_{6,25,34}=1,0$
$K_{6,27,25}=0,3$
$K_{6,27,28}=0,7$
$K_{6,27,29}=0,3$
$K_{6,27,35}=0,3$
$K_{6,27,30}=0,7$
$K_{6,28,30}=1,0$
$K_{6,29,25}=1,0$
$K_{6,29,35}=1,0$
$K_{10,25,35}=1,0$
$K_{10,27,25}=1,0$
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$K_{10,27,34}=1,0$
$K_{10,27,39}=1,0$
$K_{10,27,32}=1,0$
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$K_{10,29,39}=1,0$
$K_{10,29,32}=1,0$
$K_{10,29,33}=1,0$
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$K_{12,6,7}=1,0$
$K_{12,6,8}=1,0$
$K_{12,6,25}=1,0$
$K_{12,7,8}=1,0$
$K_{12,7,25}=1,0$
$K_{12,9,4}=1,0$
$K_{12,9,5}=1,0$
$K_{12,9,6}=1,0$
$K_{12,9,7}=1,0$
$K_{12,9,8}=1,0$
$K_{12,9,14}=1,0$
$K_{12,9,15}=1,0$
$K_{12,9,17}=1,0$
$K_{12,9,18}=1,0$
$K_{12,9,20}=1,0$
$K_{12,9,22}=1,0$
$K_{12,9,24}=1,0$
$K_{12,9,25}=1,0$
$K_{12,11,4}=1,0$
$K_{12,11,5}=1,0$
$K_{12,11,6}=1,0$
$K_{12,11,7}=1,0$
$K_{12,11,8}=1,0$
$K_{12,11,9}=1,0$
$K_{12,11,14}=1,0$
$K_{12,11,15}=1,0$
$K_{12,11,17}=1,0$
$K_{12,11,18}=1,0$
$K_{12,11,20}=1,0$
$K_{12,11,22}=1,0$
$K_{12,11,24}=1,0$
$K_{12,11,25}=1,0$
$K_{12,14,4}=1,0$
$K_{12,14,5}=1,0$
$K_{12,14,6}=1,0$
$K_{12,14,7}=1,0$
$K_{12,14,8}=1,0$
$K_{12,14,15}=1,0$
$K_{12,14,18}=1,0$
$K_{12,14,20}=1,0$
$K_{12,14,22}=1,0$
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$K_{12,15,7}=1,0$
$K_{12,15,8}=1,0$
$K_{12,15,22}=1,0$
$K_{12,15,24}=1,0$
$K_{12,15,25}=1,0$
$K_{12,17,4}=1,0$
$K_{12,17,5}=1,0$
$K_{12,17,6}=1,0$
$K_{12,17,7}=1,0$
$K_{12,17,8}=1,0$
$K_{12,17,14}=1,0$
$K_{12,17,15}=1,0$
$K_{12,17,18}=1,0$
$K_{12,17,20}=1,0$
$K_{12,17,22}=1,0$
$K_{12,17,24}=1,0$
$K_{12,17,25}=1,0$
$K_{12,18,4}=1,0$
$K_{12,18,5}=1,0$
$K_{12,18,6}=1,0$
$K_{12,18,7}=1,0$
$K_{12,18,8}=1,0$
$K_{12,18,15}=1,0$
$K_{12,18,20}=1,0$
$K_{12,18,22}=1,0$
$K_{12,18,24}=1,0$
$K_{12,18,25}=1,0$
$K_{12,22,4}=1,0$
$K_{12,22,5}=1,0$
$K_{12,22,6}=1,0$
$K_{12,22,7}=1,0$
$K_{12,22,8}=1,0$
$K_{12,22,24}=1,0$
$K_{12,22,25}=1,0$
$K_{12,24,4}=1,0$
$K_{12,24,5}=1,0$
$K_{12,24,6}=1,0$
$K_{12,24,7}=1,0$
$K_{12,24,8}=1,0$
$K_{12,24,25}=1,0$
$K_{12,33,28}=1,0$

Notes: 1. For all values of $i = j, K_{kii} = 1.0$; 2. $K_{k,i,j} = K_{k,j,i}$;
3. Values of $K_{k,i,j} = 0$ are not shown in the table.

Table 5

Evaluated ^{235}U cross-sections and errors in evaluation both using and not using correlations for optimum weights

Range No.	Energy, keV	K, b	Errors in evaluation, %		
			K=0	K	K=I
1	0,1-0,2	20,71	1,44	3,06	3,22
	0,2-0,3	20,19			
2	0,3-0,4	12,88	1,68	3,24	3,44
3	0,4-0,5	13,54	1,50	3,16	3,39
	0,5-0,6	14,69			
4	0,6-0,7	11,20	1,87	3,70	4,27
	0,7-0,8	10,80			

Table 5 (cont.)

Range No.	Energy, keV	K,b	Errors in evaluation, %		
			K=0	K	K=I
5	0,8-0,9	7,92	1,91	3,71	4,27
	0,9-1,0	7,34			
6	1,0-2,0	7,10	1,42	3,15	3,39
7	2,0-3,0	5,27	1,68	3,71	4,27
	3,0-4,0	4,73			
8	4,0-5,0	4,15	1,55	3,35	3,80
9	5,0-6,0	3,70	1,69	3,94	4,58
	6,0-7,0	3,31			
	7,0-8,0	3,26			
	8,0-9,0	2,89			
	9,0-10,0	3,06			
10	10,0-20,0	2,4[illegible]	2,02	3,56	3,82
11	20,0-30,0	2,10	2,05	3,70	4,07
12	30,0-40,0	2,000	1,25	1,57	2,65
	40,0-50,0	1,845			
	50,0-60,0	1,823			
	60,0-70,0	1,749			
	70,0-80,0	1,677			
	80,0-90,0	1,617			
	90,0-100	1,575			
13	100	1,555	I,II	I,25	I,99
	105	1,550			
	110	1,545			
	115	1,532			
	120	1,522			
	125	1,511			
	130	1,501			
	135	1,489			
	140	1,478			
	145	1,468			
	150	1,458			
	155	1,448			
	160	1,438			
	165	1,429			
	170	1,419			
	175	1,410			
	180	1,399			
	185	1,390			
	190	1,380			
	195	1,374			
	200	1,366			
	205	1,361			
	210	1,350			
	215	1,344			
	220	1,338			
	225	1,333			
	230	1,323			
13	235	1,318	I,II	I,25	I,99
	240	1,311			
	245	1,306			
	250	1,300			
	255	1,294			
	260	1,289			
	265	1,284			
	270	1,279			
	275	1,275			
	280	1,270			
	285	1,266			
	290	1,262			
	295	1,256			
	300	1,250			
	305	1,245			
	310	1,240			
	315	1,237			
	320	1,233			
	325	1,230			
	330	1,228			
	335	1,224			
	340	1,221			
	345	1,220			
	350	1,219			
14	355	1,217	I,2I	I,45	2,57
	360	1,215			
	365	1,215			
	370	1,215			
	375	1,215			
	380	1,214			
	385	1,214			
	390	1,213			
	395	1,213			
	400	1,212			
	405	1,211			
	410	1,209			
	415	1,207			
	420	1,206			
	425	1,205			
	430	1,203			
	435	1,200			
	440	1,196			
	445	1,194			
	450	1,191			
	455	1,188			
	460	1,186			
	465	I,183			
	470	1,181			

Table 5 (cont.

Range No.	Energy, keV	K,b	Errors in evaluation, %			Range No.	Energy, keV	K,b	Errors in evaluation, %		
			K=0	K	K=I				K=0	K	K=I
14	475	1,178	1,2I	I,45	2,57	15	750	1,104	0,83	1,00	1,53
	480	1,176					760	1,106			
	485	1,173					770	1,109			
	490	1,170					780	1,111			
	495	1,168					790	1,115			
	500	1,166					800	1,117			
	505	1,163					810	1,122			
	510	1,160					820	1,127			
	515	1,158					830	1,132			
	520	1,157					840	1,137			
	525	1,155					850	1,144			
	530	1,153					860	1,150			
	535	1,151					870	1,159			
	540	1,149					880	1,165			
	545	1,148					890	1,172			
	550	1,146					900	1,180			
	555	1,143					910	1,185			
	560	1,141					920	1,190			
	565	1,140					930	1,194			
	570	1,138					940	1,200			
	575	1,136					950	1,204			
	580	1,134					960	1,208			
	585	1,132					970	1,210			
	590	1,131					980	1,212			
	595	1,130					1000	1,215			
	600	1,128					1020	1,216			
	605	1,126					1050	1,218			
	610	1,124					1100	1,220			
	615	1,122					1150	1,225			
	620	1,121					1200	1,226			
	625	1,120					1250	1,230			
	630	1,119					1300	1,232			
	635	1,117					1350	1,235			
	640	1,115					1400	1,239			
	645	1,114					1450	1,244			
	650	1,113					1500	1,248			
	660	1,111					1550	1,252			
	670	1,109				16	1600	1,256	0,92	I,02	I,3
	680	1,107					1650	1,265			
	690	1,106					1700	1,271			
	700	1,105					1750	1,274			
	710	1,102					1800	1,276			
	720	1,101					1850	1,278			
	730	1,100					1900	1,281			
	740	1,100					1950	1,282			
	745	1,102					2000	1,284			

Table 5 (cont.)

Range No.	Energy, keV	K,b	Errors in evaluation, % K=0	K	K=I
16	2050	1,284	0,92	I,02	I,30
	2100	1,284			
	2150	1,281			
	2200	1,278			
	2250	1,273			
	2300	1,268			
	2350	1,263			
	2400	1,258			
	2450	1,253			
	2500	1,248			
	2550	1,242			
	2600	1,237			
	2650	1,233			
	2700	1,230			
	2750	1,225			
	2800	1,221			
	2900	1,213			
	3000	1,205			
17	3100	1,201	I,26	I,31	I,71
	3150	1,197			
	3200	1,195			
	3250	1,192			
	3300	1,189			
	3350	1,186			
	3400	1,183			
	3450	1,180			
	3500	1,177			
	3550	1,174			
	3600	1,171			
	3650	1,168			
	3700	1,165			
	3750	1,162			
	3800	1,159			
	3850	1,156			
	3900	1,154			
	4000	1,147			
	4050	1,144			
	4100	1,141			
	4150	1,138			
	4200	1,135			
	4250	1,132			
	4300	1,129			
	4350	1,125			
	4400	1,122			
	4450	1,119			
	4500	1,117			
	4550	1,114			
	4600	1,111			
17	4650	1,108	I,26	I,31	I,71
	4700	1,105			
	4750	1,102			
	4800	1,099			
	4850	1,096			
	4900	1,093			
	5000	1,087			
18	5050	1,083	I,27	I,39	I,71
	5100	1,080			
	5200	1,073			
	5300	1,067			
	5400	1,060			
	5500	1,052			
	5600	1,050			
	5700	1,058			
	5800	1,075			
	5900	1,103			
	6000	1,139			
	6100	1,182			
	6200	1,231			
	6300	1,282			
	6400	1,334			
	6500	1,386			
	6600	1,435			
	6700	1,482			
	6800	1,524			
	6900	1,564			
	7000	1,600			
	7100	1,634			
	7200	1,667			
	7300	1,698			
	7400	1,728			
	7500	1,755			
	7600	1,775			
	7700	1,795			
	7800	1,805			
	7900	1,815			
	8000	1,820			
	8100	1,823			
	8200	1,825			
	8300	1,826			
	8400	1,826			
	8500	1,824			
	8600	1,827			
	8700	1,820			
	8800	1,817			
	8900	1,814			
	9000	1,812			

Table 5 (cont.)

Range No.	Energy, keV	K, b	Errors in evaluation, %		
			K=0	K	K=I
18	9100	1,810	1,27	I,39	I,7I
	9200	1,808			
	9300	1,805			
	9400	1,803			
	9500	1,800			
	9600	1,797			
	9700	1,794			
	9800	1,792			
	9900	1,789			
	10000	1,786			
	10100	1,784			
	10200	1,782			
	10300	1,780			
	10400	1,778			
	10500	1,776			
	10600	1,774			
	10700	1,773			
	10800	1,772			
	10900	1,771			
	11000	1,770			
	11100	1,770			
	11200	1,769			
	11300	1,769			
	11400	1,769			
	11500	1,769			
	11600	1,769			
	11700	1,769			
	11800	1,768			
	11900	1,768			
	12000	1,768			
19	12100	1,770	1,10	1,13	1,73
	12200	1,777			
	12300	1,785			
	12400	1,796			
	12500	1,813			
	12600	1,833			
	12700	1,857			
	12800	1,880			
	12900	1,902			
	13000	1,922			
	13100	1,941			
	13200	1,955			
	13300	1,980			
	13400	1,990			
	13500	2,006			
	13600	2,020			
	13700	2,032			
I9	13800	2,043	1,10	1,13	1,73
	13900	2,054			
	14000	2,063			
20*/	14100	2,071	1,19	-	1,86
	14200	2,079			
	14300	2,085			
	14400	2,091			
	14500	2,095			
	14600	2,099			
	14700	2,103			
	14800	2,105			
	14900	2,107			
	I5000	2,I08			
21	15100	2,108	3,40	3,43	3,64
	15200	2,108			
	15300	2,107			
	15400	2,106			
	15500	2,104			
	15600	2,101			
	15700	2,099			
	15800	2,095			
	15900	2,091			
	16000	2,087			
	16100	2,083			
	16200	2,078			
	16300	2,073			
	16400	2,068			
	16500	2,062			
	16600	2,056			
	16700	2,051			
	16800	2,045			
	16900	2,039			
	17000	2,032			
	17100	2,026			
	17200	2,020			
	17300	2,014			
	17400	2,008			
	17500	2,003			
	17600	1,997			
	17700	1,992			
	17800	1,986			
	17900	1,981			
	18000	1,977			
	18100	1,973			
	18200	1,969			
	18300	1,965			

*/ The range shown in this box is the same as No. 21, but with modified errors.

Table 5 (cont.)

Range No.	Energy, keV	K,b	Errors in evaluation, % K=0	K	K=I
21	18400	1,962	3,40	3,43	3,64
	18500	1,960			
	18600	1,958			
	18700	1,956			
	18800	1,956			
	18900	1,956			
	19000	1,956			
	19100	1,957			
	19200	1,959			
21	19300	1,962	3,40	3,43	3,64
	19400	1,966			
	19500	1,970			
	19600	1,976			
	19700	1,982			
	19800	1,989			
	19900	1,998			
	20000	2,015			

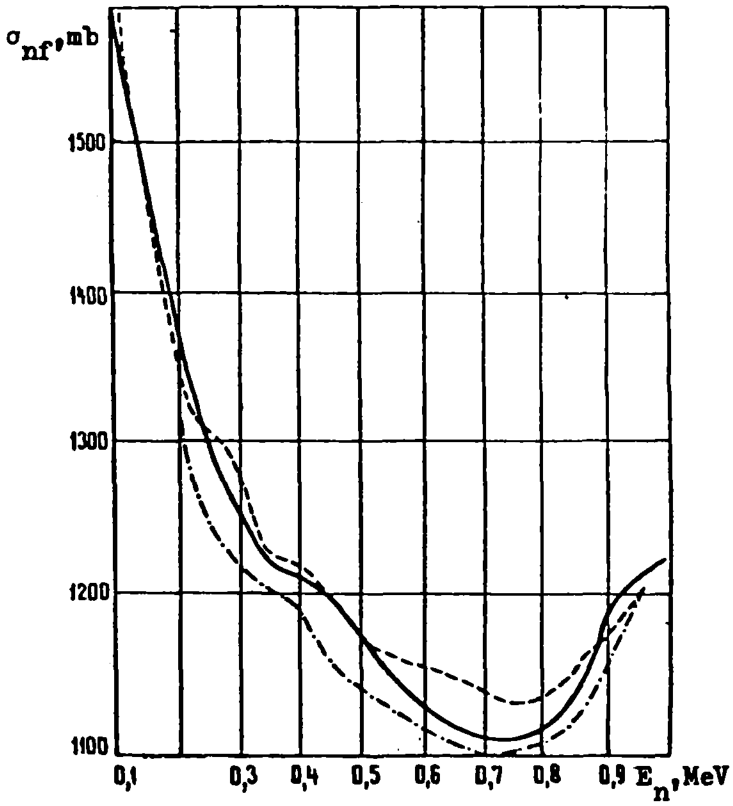

Fig. 1: Evaluated ^{235}U fission cross-section curves in the energy range 0.1-1.0 MeV. Data: – – – – ENDF/B-IV;
–·–·–·– ENDF/B-V;
——— present paper.

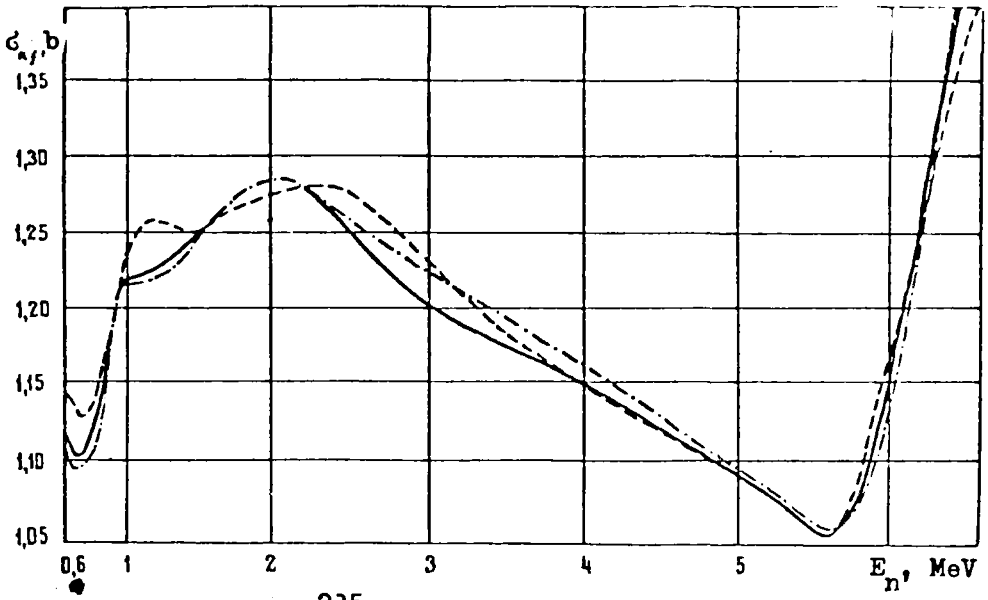

Fig. 2. Evaluated ^{235}U fission cross-section curves in the energy range 0.6–6.6 MeV. Data: - - - - - ENDF/B-IV;

–·–·–·–·– ENDF/B-V;

———— present paper.

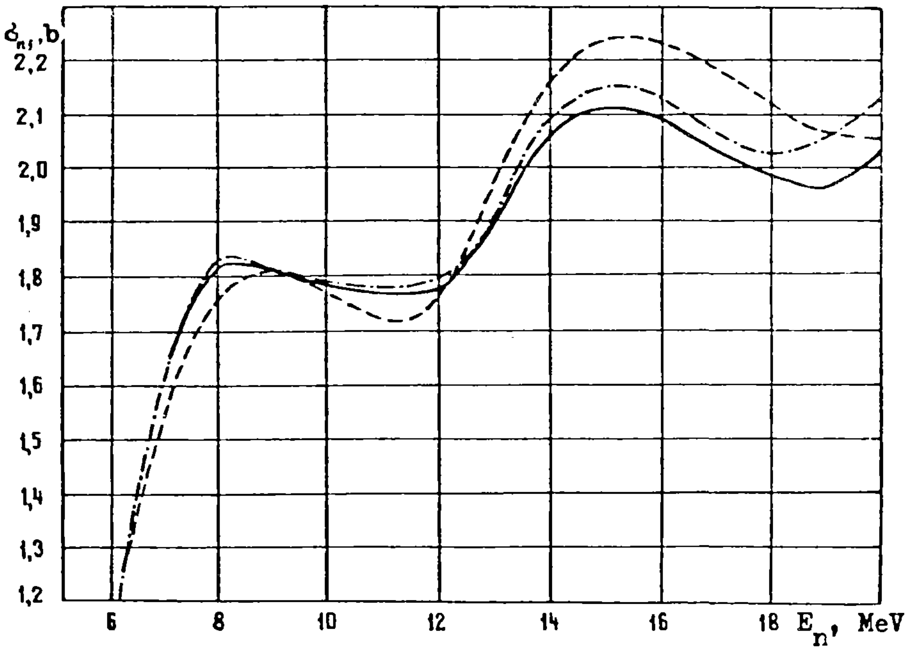

Fig. 3. Evaluated ^{235}U fission cross-section curves in the energy range 5–20 MeV. Data: - - - - - ENDF/B-IV;

–·–·–·–·– ENDF/B-V;

———— present paper.

ANNEXES

In Annexes 1 and 2 the following key is used for the different energy ranges (n,m):

1 .... 0,1-0,3 keV
2............. 0,3-0,4 keV
3... .... 0,4-0,6 keV
4............. 0,6-0,8 keV
5............. 0,8-1,0 keV
6............. 1,0-2,0 keV
7............. 2,0-4,0 keV
8............. 4,0-5,0 keV
9............. 5,0-10,0 keV
10.............10,0-20,0 keV
11.............20,0-30,0 keV
12 ....30,0-110,0 keV
13 ....110,0-350,0 keV
14 ....350,0-750,0 keV
15 ....0,75 - 1,50 MeV
16 .. ..1,50 - 3,00 MeV
17 . ...3,00 - 5,00 MeV
18 ....5,00 -12,00 MeV
19 ....12,00-14,00 MeV
20 ....14,10-15,00 MeV
21 ....15,00-20,00 MeV

ANNEX 1

Optimized weights for experimental data with absence of correlation, assigned correlation and total correlation, and experimental ^{235}U fission cross-sections for different energy ranges[*]

n,m = 1

Ref.	K=0	K	K=1	σ_f, b	
				0,1-0,2	0,2-0,3
[11]	0,111	0,150	0,000	20,33	20,16
[19]	0,096	0,000		20,13	20,03
[17]	0,040	0,039		20,93	20,23
[14]	0,045	0,000		20,66	19,85
[18]	0,031	0,001		20,51	20,69
[20]	0,042	0,000		21,10	20,00
[15]	0,032			19,80	19,96
[22]	0,087			20,19	20,08
[4]	0,091			20,65	19,92
[6]	0,066			20,38	20,33
[7]	0,174	0,267	0,378	20,89	19,96
[8]	0,186	0,543	0,622	20,72	20,31

n,m = 2

Ref.	K = C	K	K = 1	σ_f, b
[11]	0,151	0,206	0,000	12,72
[19]	0,127	0,000		12,89
[17]	0,055			12,82
[14]	0,062			13,91
[18]	0,009			12,57
[20]	0,058			12,89
[15]	0,043			12,55
[22]	0,119			12,81
[4]	0,140	0,110		12,86
[7]	0,236	0,684	1,000	12,93

n,m = 3

Ref.	K=0	K	K=1	σ_f, b	
				0,4-0,5	0,5-0,6
[11]	0,121	0,223	0,000	13,30	14,83
[19]	0,102	0,000		13,17	14,88
[17]	0,044	0,010		13,67	14,76
[14]	0,050	0,000		12,75	14,08
[18]	0,033			13,98	14,68
[20]	0,046			13,36	14,59
[15]	0,034			12,92	14,25
[22]	0,095			13,39	14,95
[4]	0,112	0,026		13,24	14,79
[7]	0,190	0,396	0,666	13,34	14,69
[8]	0,173	0,345	0,334	13,37	14,60

n,m = 4

Ref.	K =0	K	K =1	σ_f, b	
				0,6-0,7	0,7-0,8
[11]	0,188	0,380	0,705	11,21	10,89
[19]	0,158	0,000	0,000	11,25	10,85
[17]	0,068	0,098		11,28	10,57
[14]	0,077	0,000		11,29	10,46
[18]	0,060	0,062		10,92	10,46
[20]	0,072	0,000		11,08	10,66
[15]	0,054			11,28	10,98
[22]	0,148	0,109		11,25	10,83
[4]	0,175	0,351	0,295	11,21	10,81

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[*] Energy units coincide with those given for the whole energy range (see above).

n,m = 5

Ref.	K=0	K	K=1	σ_f, b	
				0,8-0,9	0,9-1,0
[11]	0,197	0,432	0,705	8,00	7,39
[19]	0,165	0,000	0,000	8,23	7,41
[17]	0,063	0,098		7,46	6,98
[14]	0,081	0,000		8,27	7,57
[18]	0,057	0,064		7,44	7,54
[20]	0,070	0,000		7,88	7,28
[15]	0,049			8,75	8,36
[22]	0,135	0,004		7,96	7,35
[4]	0,183	0,402	0,295	8,01	7,34

n,m = 6

Ref.	K=0	K	K=1	σ_f, b
[11]	0,109	0,202	0,000	7,26
[19]	0,091	0,000		7,25
[17]	0,035			6,76
[14]	0,045			7,22
[18]	0,032			7,26
[20]	0,039			6,99
[15]	0,027			7,33
[22]	0,075			7,25
[4]	0,101	0,118		7,14
[5]	0,049	0,000		7,649
[6]	0,060			7,22
[7]	0,169	0,340	0,500	7,10
[8]	0,168	0,340	0,500	7,00

n,m = 7

Ref.	K=0	K	K=1	σ_f, b	
				2-3	3-4
[11]	0,152	0,415	0,705	5,41	4,92
[19]	0,128	0,013	0,000	5,26	4,74
[17]	0,048	0,097		5,07	4,53
[14]	0,063	0,006		5,49	4,65
[18]	0,044	0,061		5,19	4,49
[20]	0,054	0,007		5,04	4,49
[15]	0,054	0,000		5,37	4,70
[22]	0,104			5,25	4,67
[24]	0,057			5,365	4,900
[4]	0,141	0,398	0,295	5,18	4,62
[5]	0,069	0,000	0,000	5,602	4,897
[6]	0,066			5,35	4,59

n,m = 8

Ref.	K=0	K	K=1	σ_f, b
[11]	0,129	0,253	0,000	4,41
[19]	0,108	0,000		4,30
[17]	0,041	0,015		4,03
[14]	0,053	0,000		4,28
[18]	0,038	0,037		3,82
[20]	0,046	0,000		4,08
[15]	0,032			4,27
[22]	0,088			4,19
[24]	0,048			4,376
[4]	0,120	0,224		4,12
[5]	0,058	0,000		4,343
[6]	0,071			4,26
[8]	0,168	0,471	1,000	4,05

n,m = 9

Ref.	K=0	K	K=1	σ_f, b				
				5-6	6-7	7-8	8-9	9-10
[11]	0,129	0,353	0,425	3,69	3,53	3,61	2,86	3,00
[19]	0,100	0,000	0,000	3,84	3,40	3,15	2,95	2,99
[17]	0,046	0,121		3,66	3,09	3,05	2,79	3,02
[14]	0,049	0,000		4,04	3,57	3,35	3,30	3,23
[18]	0,038	0,051		3,29	3,00	2,88	2,88	3,09
[20]	0,053	0,006		3,99	3,08	3,06	2,90	2,98
[15]	0,031	0,000		3,64	3,27	3,23	3,05	3,15
[22]	0,105	0,072		3,62	3,52	3,09	3,04	2,99
[24]	0,057	0,000		3,934	3,336	3,307	3,044	3,166
[4]	0,131	0,342	0,544	3,75	3,17	3,08	2,91	3,04
[5]	0,079	0,000	0,000	3,929	3,28	3,184	2,981	3,06
[6]	0,084			3,72	3,35	3,12	2,88	3,19
[25]	0,098	0,055	0,031	3,93	3,25	3,21	2,92	3,12

n,m = 10

Ref.	K = 0	K	K = 1	σ_f, b
[19]	0,088	0,004	0,000	2,447
[17]	0,062	0,000		2,34
[20]	0,074			2,33
[24]	0,075			2,511
[4]	0,161	0,274		2,48
[5]	0,113	0,000		2,456
[7]	0,279	0,722	1,000	2,42
[25]	0,148	0,000	0,000	2,46

n,m = 11

Ref.	K = 0	K	K = 1	σ_f, b
[19]	0,091	0,040	0,000	2,12
[17]	0,064	0,000		2,10
[20]	0,076			2,00
[24]	0,081			2,162
[4]	0,167	0,306		2,13
[5]	0,117	0,000		2,102
[7]	0,254	0,654	1,000	2,085
[25]	0,150	0,000	0,000	2,095

n,m = 12

Ref.	K=0	K	K=I	σ_f, b
[17]	0,024	0,000	0,000	I,9(30-40)[x] I,8I3(40-50) I,77(50-60) I,7I(60-70) I,62(70-80) I,59(80-90) I,55(90-I00)
[24]	0,025			2,052(30-40) I,939(40-50) I,894(50-60) I,849(60-70) I,77(70-80) I,694(80-90) I,645(90-I00)
[4]	0,043	0,026		I,96(30-40) I,84(40-50) I,84(50-60) I,78(60-70) I,73(70-80) I,60(80-90) I,57(90-I00)
[5]	0,044	0,005		I,92(30-40) I,837(40-60) I,8II(50-60) I,762(60-70) I,682(70-80) I,565(80-90) I,54I(90-I00)
[27]	0,I58	0,0I3		I,80(42) I,765(68) I,74(72,5) I,54(95)
[28]	0,2I6	0,3I5	0,80I	I,975(38) 2,047(40) I,849(5I) I,822(55) I,7I(7I) I,707(75) I,556(88)
				2,02(33) I,85(46) I,83(58) I,7(78) I,65(83,5) I,55(93) I,53(I03,5)
[29]	0,I93	0,282	0,I00	2,I0(40) I,786(67,5)
[26]	0,I75	0,255	0,003	2,006(35) I,93I(40) I,856(45) I,8I8(5I) I,794(55) I,772(60) I,7I(7I) I,647(80) I,588(90) I,555(I00)
[7]	0,068	0,I00	0,000	I,79(40-50) I,77(50-60) I,76(60-70) I,53(80-90) I,30(I65-I95)
[25]	0,054	0,004	0,096	I,93(30-40) I,77(40-50) I,74(50-60) I,69(60-70) I,6I(70-80) I,57(80-90) I,57(90-I00)

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x/ Here and below the energy or energy range at which the fission cross-section was measured is shown in brackets.

n,m = 13

Annex 1 (cont.)

Ref.	K=0	K	K=I	σ_f, b
[4]	0,030	0,000	0,000	I,50(I00-200)
[5]	0,033	0,00I		I,402(I00-200) I,229(200-300)
[27]	0,077	0,003		I,53(II0) I,57(I20) I,5(I25) I,5(I45) I,45(I50) I,44(I52)(I54) I,45(I56) I,365(I95) I,325(2I5) I,295(227) I,285(25I) I,275(257) I,27(286) I,285(3I3) I,I9(320) I,2I(33I)
[26]	0,I69	0,I87		I,58(I24) I,52(II6) I,42(I35) I,46(I50)(I72) I,42(I99)
[29]	0,I84	0,203	0,I58	I,54(I27) I,52(I60) I,38(207) I,30(3I2)
[26]	0,I36	0,I50	0,000	I,493(I20) I,437(I40) I,387(I70) I,357(200) I,307(25I) I,268(300) I,228(350
[7]	0,024	0,027		I,23(2I0-230) I,23(230-250) I,225(250-270) I,205(275-295) I,I65(295-3I5) I,I75(3I5-335) I,I45(335-355)
[25]	0,046	0,050	0,034	I,45(I00-I50) I,36(I50-200) I,22(200-300)
[38]	0,30I	0,379	0,808	I,47I(I40) I,27I(265)

n,m = 14

Ref.	K=0	K	K=I	σ_f, b
[5]	0,037	0,050	0,000	I,I6(300-400) I,II9(400-500) I,I(500-600) I,089(600-700)
[27]	0,I9I	0,048	0,304	I,2I5(369) I,205(407) I,I6(506)(540) I,I4(665)
[28]	0,I7I	0,2I3	0,000	I,I4(730)
[29]	0,2I4	0,268	0,5I8	I,22(404) I,I7(505)
[26]	0,I63	0,203	0,I32	I,20I(400) I,I6(500) I,I25(600) I,II(700)
[34]	0,I24	0,I54	0,000	I,207(546) I,2I5(662) I,I64(758)
[39]	0,030	0,037		I,28(404) I,24(5I3) I,27(562) I,I7(673)
[7]	0,0I9	0,023		I,I55(355-370) I,095(400-450) I,06(450-500) I,07(500-550) I,075(550-580) I,035(600-650) I,0I5(650-680)
[25]	0,05I	0,004		I,I6(300-400) I,I3(400-500) I,I0(500-600) I,09(600-700)

n,m = 15

Ref.	K=0	K	K=I	σ_f, b
[5]	0,0I7	0,0I5	0,000	I,089(700-800) I,I22(800-900) I,I80(900-I,0)
[27]	0,083	0,025		I,I35(8I0) I,205(I,0I)
[28]	0,082	0,087		I,I4(880) I,I88(920) I,I87(I,02) I,207(I,28) I,229(I,405) I,255(I,485)
[29]	0,I09	0,II6		I,22(I,0)
[26]	0,077	0,082		I,II(800) I,I2(840) I,I35(860) I,I6I(890) I,I85(920) I,2I4(950) I,209(980) I,207(I,0) I,204(I,2) I,2I3(I,4) I,226(I,5)
[34]	0,074	0,079		I,I93(908) I,248(I,057) I,256(I,I25) I,22I(I,I8)
[39]	0,0I4	0,0I5		I,I9(770) I,23(869) I,27(950)
[32]	0,283	0,302	0,899	I,229(I,0) I,252(I,I) I,245(I,2) I,24I(I,3) I,224(I,4) I,26(I,5)
[33]	0,068	0,072	0,I0I	I,08(754) I,I0(786) I,09(8I9) I,I2(855) I,I6(894) I,I7(935) I,2I(979) I,22(I,026) I,2(I,077) I,22(I,I32) I,24(I,I9I) I,24(I,479) I,23(I,398) I,22(I,323) I,2I(I,254)
[25]	0,023	0,024	0,000	I,07(700-800)
[38]	0,I60	0,I7I		I,I6I(770) I,2I0(964)
[35]	0,0I0	0,0I2		I,229(I,224) I,I89(I,274) I,255(I,324) I,24I(I,374) I,2I0(I,424) I,268(I,474)

n,m = 16

Ref.	K=0	K	K=I	σ_f, b
/28/	0,I50	0,I65	0,000	I,252(I,58) I,272(I,7) I,306(I,8) I,353(I,9I5) I,3I5(2,0) I,33(2,04) I,3I8(2,I) I,294(2,I8) I,303(2,I9) I,304(2,28) I,293(2,3) I,275(2,38) I,27(2,6I)
/29/	0,084	0,092		I,3I(2,25)
/26/	0,093	0,I02		I,279(I,8) I,29(I,9) I,294(2,0) I,292(2,I) I,285(2,2) I,266(2,4) I,253(2,6) I,224(3,0)
/39/	0,0I7	0,0I9		I,3(I,5I5) I,3I(I,62)
/32/	0,489	0,536	0,948	I,232(I,58) I,285(I,7) I,267(I,8) I,266(I,9) I,262(2,0) I,265(2,2) I,245(2,4) I,242(2,5) I,2I0(2,6) I,2I6(2,7) I,20I(2,8) I,I85(2,9) I,20I(3,0)
/33/	0,080	0,077	0,052	I,25(I,568) I,27(I,66) I,26(I,77) I,28(I,887) I,3(2,0I5) I,28(2,I57) I,27(2,3I5) I,26(2,49) I,25(2,99) I,24(3,05)
/30/	0,068	0,009	0,000	I,256(2,35) I,2I9(2,6) I,206(2,78) I,203(2,85)
/35/	0,0I9	0,000		I,27(I,524) I,268(I,6) I,22I(I,625) I,252(I,674) I,284(I,726) I,257(I,775) I,267(I,824) I,25(I,872) I,263(I,923) I,284(I,973) I,25I(2,047) I,30I(2,I47) I,253(2,248) I,267(2,349) I,222(2,450) I,234(2,549) I,I8I(2,647) I,224(2,75) I,2I5(2,849) I,24I(2,95) I,I84(3,05)

n,m = 17

Ref.	K=0	K	K=I	σ_f, b
/26/	0,I76	0,I83	0,000	I,I92(3,5)
/32/	0,5I7	0,538	0,876	I,206(3,2) I,I75(3,4) I,I69(3,5) I,I73(3,6) I,I47(3,7) I,I56(3,8) I,I29(4,0) I,I35(4,2) I,II(4,4) I,09(4,6) I,I(4,8) I,08I(4,5)
/33/	0,I50	0,I56	0,I20	I,24(3,I2) I,2I(3,I8)(3,24) I,I9(3,32)(3,4) I,2(3,47) I,I9(3,55) I,I8(3,63) I,2(3,7I) I,I8(3,8) I,I9(3,89) I,I8(3,98)(4,07) I,I7(4,I7)(4,27) I,I5(4,38) I,I4(4,49)(4,6) I,I2(4,7) I,II(4,8)(5,0)
/30/	0,III	0,II5	0,004	I,I67(3,09) I,I56(3,23) I,I3(3,36) I,I37(3,55) I,I(3,8) I,088(3,92) I,I(4,47)
/35/	0,045	0,008	0,000	I,I96(3,I5) I,I62(3,25) I,I63(3,349) I,I46(3,446) I,I56(3,547) I,I43(3,647) I,I25(3,75) I,I9(3,85) I,I64(3,95) I,I66(4,05) I,I55(4,I44) I,I28(4,24) I,096(4,35) I,I22(4,446) I,I67(4,55) I,I48(4,643) I,I3I(4,742) I,I5I(4,843) I,I2I(4,949) I,058(5,046)

n,m = 18

Ref.	K=0	K	K=I	σ_f , b
[29]	0,I59	0,I33	0,000	I,00(5,4)
[32]	0,528	0,575	0,876	I,077(5,I) I,082(5,2) I,077(5,3) I,059(5,4) I,055(5,5) I,04I(5,6) I,06(5,7) I,084(5,8) I,II3(5,9) I,I37(6,0)
[33]	0,I53	0,I67	0,I20	I,09(5,II)(5,25)(5,39) I,07(5,54) I,06(5,7) I,07(5,87) I,I4(6,04) I,23(6,22) I,34(6,4) I,44(6,6) I,54(6,8I) I,6(7,02) I,69(7,25) I,75(7,48) I,79(7,73) I,82(7,99) I,83(8,27) I,82(8,55) I,8I(8,86) I,79(9,I8) I,78(9,52) I,82(9,88) I,8I(I0,25) I,77(I0,66) I,78(II,08) I,75(II,53) I,78(I2,0I)
[30]	0,II2	0,I22	0,004	I,0(5,0I5) I,03(5,53)
[35]	0,048	0,003	0,000	I,058(5;I46) I,070(5,25) I,03I(5,344) I,054(5,442) I,058(5,54I) I,099(5,644) I,05(5;75) I,0I8(5,844) I,088(5,956) I,078(6,056) I,152(6,I43) I,I69(6,248) I,I3(6,34) I,262(6,45) I,28(6,547) I,398(6,645) I,372(6,746) I,53(6,85) I,47(6,94) I,434(7,045) I,566(7,I55) I,574(7,249) I,62(7,345) I,658(7,443) I,699(7,542) I,67(7,644) I,673(7,748) I,739(7,853) I,68I(7,94) I,6(8,05) I,7I3(8,I39) I,742(8,253) I,686(8,346) I,7I8(8,44I) I,693(8,54) I,786(8,635) I,7I9(8,734) I,758(8,836) I,709(8,94) I,675(9,044) I,7(9,I5) I,666(9,232) I,704(9,342) I,773(9.454) I,709(9,539) I,707(9,655) I,686(9,743) I,686(9,833) I,695(9,954) I,669(I0,05) I,7I4(I0,I4) I,707(I0,235) I,69I(I0,364) I,68I(I0,462) I,645(I0,562) I,657(I0,663) I,709(I0,765) I,64(I0,834) I,692(I0,94) I.689(II,046) I,674(II,I54) I,667(II,227) I,692(II,337) I,708(II,45) I,727(II,526) I,7I6(II,64I) I,688(II,758) I,639(II,837) I,727(II.957)

n,m = 19

Ref.	K=0	K	K=I	σ_f , b
[29]	0,2I8	0,226	0,I79	2,I7(I4,I)
[33]	0,II4	0,II8	0,2I0	I,83(I2,52) I,9I(I3,06) 2,0I(I3,64) 2,07(I4,26)
[36]	0,333	0,345	0,6II	2,063(I4,6)
[37]	0,300	0,3II	0,000	2,I92(I4,8)
[35]	0,035	0,000		I,74I(I2.04) I,75I(I2,I6) I,762(I2,37) I,789(I2,59) I,889(I2,807) I,9I9(I3,033) I,977(I3,266) 2,003(I3.505) 2,09I(I3,75) 2,097(I4,003)

n,m = 20

Ref.	K=0	K	K=I	σ_f, b
/29/	0,256	0,256	0,220	2,I7(I4,I)
/36/	0,39I	0,39I	0,753	2,063(I4,6)
/37/	0,353	0,353	0,027	2,I92(I4,8)

n,m = 21

Ref.	K=0	K	K=I	σ_f, b
/33/	0,860	0,875	0,95F	2,08(I4,93)(I5,64) I,99(I6,4) I,95(I7,22) I,94(I8,II) I,96(I9,07) 2,03(20,I0)
/35/	0,I40	0,I25	0,044	2,I73(I4,803) 2,2(I5,086) 2,232(I5,376) 2,235(I5,675) 2,27(I5,983) 2,I8(I6,3)(I6,627) 2,I7I(I6,964) 2,I25(I7,3II) 2,I26(I7,67) 2,II9(I8,039) 2,08(I8,42) 2,04I(I8,8I4) I,989(I9,22) I,9I2(I9,64) I,9I2(20,075)

ANNEX 2

n,m	I	2	3	4	5	6	7	8	9	I0	II	I2	I3	I4	I5	I6	I7	I8	I9	20	2I
I	I,0	0,84	0,95	0,74	0,74	0,96	0,73	0,83	0,68	0,5I	0,50	0,I8	0,09	0,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2		I,0	0.90	0,86	0,85	0,83	0,76	0,69	0,70	0,62	0,6I	0,22	0,I2	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3			I,0	0,80	0,80	0,94	0,70	0,8I	0,65	0,55	0,54	0,20	0,I0	0,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00
4				I,0	I,0	0,74	0,88	0,8I	0,82	0,40	0,4I	0,I2	0,06	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
5					I,0	0,74	0,88	0,8I	0,82	0,4I	0,42	0,I2	0,07	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
6						I,0	0,79	0,88	0,74	0,59	0,58	0,23	0,I4	0,08	0,03	0,00	0,00	0,00	0,00	0,00	0,00
7							I,0	0,9I	0,94	0,5I	0,52	0,20	0,II	0,05	0,03	0,00	0,00	0,00	0,00	0,00	0,00
8								I,0	0,86	0,47	0,48	0,I8	0,I0	0,05	0,03	0,00	0,00	0,00	0,00	0,00	0,00
9									I,0	0,70	0,64	0,27	0,I8	0,I3	0,08	0,00	0,00	0,00	0,00	0,00	0,00
I0										I,0	0,99	0,45	0,28	0,2I	0,I0	0.00	0,00	0,00	0,00	0,00	0,00
II											I,0	0,45	0,28	0,2I	0,I0	0,00	0,00	0,00	0,00	0,00	0,00
I2												I,0	0,80	0,85	0,53	0,42	0,I8	0,I7	0,I9	0,2I	0,00
I3													I,0	0,7I	0,67	0,39	0,I5	0,I8	0,I8	0,20	0,00
I4														I,0	0,65	0,42	0,I7	0,I8	0,20	0,22	0,00
I5															I,0	0,7I	0,62	0,64	0,26	0,I6	0,27
I6																I,0	0,82	0,82	0,25	0,I4	0,30
I7																	I,0	0,83	0,I7	0,00	0,42
I8																		I,0	0,35	0,I9	0,43
I9																			I,0	0,92	0,37
20																				I,0	0,00
2I																					I,0

Matrix of coefficients of correlation
between energy ranges n,m with absence
of correlations between errors.

n,m	I	2	3	4	5	6	7	8	9	I0	II	I2	I3	I4	I5	I6	I7	I8	I9	20	2I
I	I,0	0,92	0,98	0,83	0,80	0,97	0,8I	0,94	0,82	0,85	0,83	0,29	0,27	0,25	0,I8	0,00	0,00	0,00	0,00	0,00	0,00
2		I,0	0,96	0,87	0,86	0,97	0,86	0,89	0,87	0,96	0,95	0,34	0,28	0,27	0,I8	0,00	0,00	0,00	0,00	0,00	0,00
3			I,0	0,86	0,84	0,99	0,84	0,95	0,85	0,90	0,88	0,3I	0,28	0,26	0,I8	0,00	0,00	0,00	0,00	0,00	0,00
4				I,0	I,0	0,89	I,0	0,9I	0,99	0,83	0,83	0,28	0,23	0,24	0,I7	0,00	0,00	0,00	0,00	0,00	0,00
5					I,0	0,88	I,0	0,90	0,99	0,82	0,82	0,27	0,22	0,24	0,I7	0,00	0,00	0,00	0,00	0,00	0,00
6						I,0	0,88	0,96	0,88	0,92	0,9I	0,32	0,28	0,26	0,I8	0,00	0,00	0,00	0,00	0,00	0,00
7							I,0	0,9I	0,99	0,83	0,83	0,28	0,22	0,24	0,I7	0,00	0 00	0,00	0,00	0,00	0,00
8								I,0	0,90	0,84	0,83	0,29	0,25	0,24	0,I8	0,00	0,00	0,00	0,00	0,00	0,00
9									I,0	0,83	0,83	0,29	0,23	0,26	0,I8	0,0I	0,00	0,00	0,00	0,00	0,00
I0										I,0	0,98	0,35	0,28	0,27	0,I6	0,00	0,00	0,00	0,00	0,00	0,00
II											I,0	0,34	0,27	0,26	0,I6	0,00	0,00	0,00	0,00	0,00	0,00
I2												I,0	0,77	0,89	0,59	0,60	0,37	0,33	0,27	0,28	0,I4
I3													I,0	0,7I	0,7I	0,48	0,30	0,28	0,22	0,23	0,I2
I4														I,0	0,70	0,62	0,37	0,36	0,29	0,30	0,I6
I5															I,0	0,82	0,68	0,73	0,37	0,28	0,4I
I6																I,0	0,84	0,84	0,32	0,23	0,39
I7																	I,0	0,87	0,25	0,I0	0,43
I8																		I,0	0,37	0,24	0,5I
I9																			I,0	0,94	0,45
20																				I,0	0,I5
2I																					I,0

Matrix of coefficients of correlation between energy ranges n,m for assigned correlations between errors.

n,m	I	2	3	4	5	6	7	8	9	I0	II	I2	I3	I4	I5	I6	I7	I8	I9	20	2I
I	I,0	0,93	0,98	0,88	0,88	0,98	0,88	0,96	0,86	0,90	0,88	0,56	0,47	0,5I	0,64	0,58	0,64	0,64	0,70	0,39	0,93
2		I,0	0,98	0,94	0,94	0,98	0,94	0,87	0,93	0,99	0,96	0,68	0,52	0,62	0,55	0,50	0,55	0,55	0,72	0,44	0,88
3			I,0	0,95	0,95	I,0	0,95	0,95	0,93	0,97	0,95	0,68	0,55	0,62	0,64	0,57	0,64	0,64	0,75	0,46	0,94
4				I,0	I,0	0,93	I,0	0,9I	0,99	0,96	0,95	0,83	0,74	0,74	0,73	0,64	0,75	0,75	0,83	0,60	0,92
5					I,0	0,93	I,0	0,9I	0,99	0,96	0,95	0,83	0,74	0,74	0,73	0,64	0,75	0,75	0,83	0,60	0,92
6						I,0	0,93	0,95	0,92	0,96	0,94	0,66	0,52	0,6I	0,64	0,59	0,64	0,64	0,74	0,44	0,93
7							I,0	0,9I	0,99	0,96	0,95	0,83	0,74	0,74	0,73	0,64	0,75	0,75	0,83	0,60	0,92
8								I,0	0,89	0,88	0,86	0,68	0,6I	0,60	0,77	0,69	0,79	0,79	0,76	0,48	0,97
9									I,0	0,96	0,94	0,83	0,73	0,74	0,72	0,64	0,74	0,74	0,8I	0,58	0,90
I0										I,0	0,97	0,77	0,59	0,70	0,6I	0,54	0,6I	0,6I	0,75	0,50	0,88
II											I,0	0,8I	0,63	0,75	0,64	0,59	0,63	0,63	0,85	0,64	0,83
I2												I,0	0,87	0,96	0,77	0,74	0,78	0,78	0,87	0,84	0,62
I3													I,0	0,8I	0,83	0,76	0,85	0,85	0,76	0,73	0,57
I4														I,0	0,79	0,8I	0,76	0,76	0,85	0,86	0,49
I5															I,0	0,97	0,99	0,99	0,8I	0,72	0,66
I6																I,0	0,93	0,93	0,79	0,74	0,54
I7																	I,0	I,0'	0,8I	0,70	0,70
I8																		I,0	0,8I	0,70	0,70
I9																			I,0	0,92	0,88
20																				I,0	0,36
2I																					I,0

Matrix of coefficients of correlation between energy ranges n,m for total correlation between errors.

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