

Improvement and extension of CINDA-2001 format

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During the software development and implementation of CINDA-2001 database and especially working on automatic import of EXFOR charged particle data into the new CINDA format, it appeared that some minor changes of the format would be very useful (see: Improvements). Unresolved issue with multiple translation of old CINDA to new <Reaction, Quantity> was solved in NDS version of CINDA database by keeping the old Quantity codes in the new CINDA (finally, users can retrieve data by old Quantity codes). More radical changes (Extensions) are aimed to the future development of CINDA; they need more time to think, to be agreed and accepted.

Improvements

- 1) To extend Sequence number to at least up to 3 digits. The reason is that some of EXFOR Entries have more than 99 Subentries, but the data naturally have to be in one CINDA block.
- 2) For Hierarchy Codes 8 and 9 Energy fields are not used, then if Hierarchy Code will be moved just after Sequence Number, the place of Energy can be used for products and institutes.
- 3) For Block-related information (Hierarchy 8 and 9) Sequence Number counting should be negative (-1, -2, -3, etc.). (This item is questionable...)
- 4) To have old Quantity field (3 columns: 135..137) where it is known and appropriate.
- 5) To allow not to repeat block information in lines starting from second. This will make format more human readable and easier for search.

Extensions

CINDA-2001 format has fixed fields and their positions limiting nature and size of information for exchange between data centers. At the same time, CINDA database can have more data in it (such as **title, list of authors, connectors to NSR and ENDF** databases, products, etc.) that can be taken automatically (e.g. from EXFOR) or compiled in future. In this case and also for the future needs, it would be very useful to foresee a flexible extension of CINDA-2001 format and adjust software already now.

Secondly, CINDA-2001 format is line-oriented (blocks are defined implicitly), and **information related to block** (products and institutes) is presented in lines with Hierarchy codes 8 and 9 and separate Sequence#; but it is not a separate line by its nature, although can be properly treated by software. This is also not prepared for further development, because the meaning of hierarchy is fixed and for new type of information we do need a new hierarchy code (by the way, since hierarchy is one digit, all codes are already occupied).

The aim of the proposal is to allow CINDA-2001 format to have a flexible extensions for both lines and blocks:

- 1) CINDA-Line can be given in CINDA-2001 format (lets call it LONG-LINE)
- 2) CINDA-Line can also be given as combination of two lines:
<BLOCK, SHORT-LINES>:
 - a) BLOCK: first line in the bunch of CINDA-Lines, following to it. This is leading line with block-information starting with block-flag (“B”), in fact, it is columns 1..38 of CINDA-2001 format
 - b) SHORT-LINES: lines containing CINDA-Line without BLOCK, but with leading Operation-Code. SHORT and LONG lines are differentiated by case of Operation-Code: capital for LONG and lower-case for SHORT. Corresponds to columns 39..135 of CINDA-2001 format
- 3) Both CINDA-Line and BLOCK can have an extension in one or more following line(s) with sign “+” in the first position, keyword in columns 2..11 and information in positions 12..132.

If there is no keyword given (blank space), this means multi-line information (the line still should have sign “+” in the first column). An information given in CINDA-Line or Block can be continued in [overwritten by] its extension, e.g. to make long (multi-line) comment, or make reference with the code longer than 23 symbols. Keywords which are not known for some versions of software can be ignored.

Full list of extensions can be discussed if the new format will be accepted.

Examples of keywords:

- CINDA-Line: Author, Title, Comment, Reference, NSR-KeyNo;
- CINDA-Block: Product, Institute (instead of Hierarchy codes 8 and 9).

Appendix 1. IMPROVEMENTS

| Operation Code | ~BlockID (unique) | | | Quantity | Lab | Block # | Seq. # | Hierarchy | Work -type | Reader | E-min | E-max | Reference | Date-ref | Comment | Date-mod | Quantity | |
|----------------|-------------------|---|--------|----------|--------------|---------|-------------|-------------------------|----------------------------|---------------------------|-----------------------|-----------------------|----------------|--------------------------------------|-----------------|-----------------|------------|----------|
| | Z | A | Meta | | | | | | | | | | | | | | | Reaction |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| A | 0 | 1 | N, TOT | CS | 1USAPTN17730 | | 13 | EC | 7.0+08 | 3.6+09 | J, PR/D, 8, 136 | | 197307 | Devlin+ MOM = 0.7-3.6 GEV/C. | 19900117 | TOT | | |
| A | | | | | | | 26 | EC | 7.0+08 | 3.6+09 | 4, EXFOR10365.005 | | 198304 | .26 PTS. SIGMA. | 19900117 | TOT | | |
| A | | | | | | | 36 | EC | 7.0+08 | 3.6+09 | 4, EXFOR10365.004 | | 198304 | .26 PTS. SIGMA. N-P + N-N. | 19900117 | TOT | | |
| A | | | | | | | -19 | EC | 1USABNL | 1USALAS | 2FR ILL | 2GERJUL | 2GERKFK | | | 19900117 | TOT | |
| A | 0 | 1 | N, TOT | CS | 1USALRL17000 | | 15 | T+ | | 6.0+07 | R, DOE-NDC-47, 86 | | 198804 | Brown+ NDG. | 19900117 | TOT | | |
| A | 0 | 1 | N, EL | DA | 1USAUI 17000 | | 13 | T+ | 5.0+07 | 2.0+08 | J, PR/C, 36, 2221 | | 198712 | Schiavilla+ GRPHS.CORREL.BORN APPROX | 19900117 | DEL | | |
| A | 0 | 1 | N, EL | DA | 1USALRL17000 | | 15 | T+ | | 6.0+07 | R, DOE-NDC-47, 86 | | 198804 | Brown+ NDG. | 19900117 | DEL | | |
| A | 1 | 1 | N, X | EVL | 1USAYAL10010 | | 13 | D8 | | 1.0+07 | J, ARN, 2, 365 | | 195300 | Breit+SCATT LENGTH- SEE PAGE 384 | 19900117 | EVL | | |
| A | 1 | 1 | N, X | EVL | 1USAUNC10010 | | 13 | DC | 2.5-02 | 1.0+07 | R, NDA-57-27 | | 195609 | Monroe+.TOT,ABS.TABLE+CURVE | 19900117 | EVL | | |
| A | 1 | 1 | N, X | EVL | 1USAGEN10010 | | 13 | D8 | 3.2-02 | 1.0+07 | R, APEX-467 | | 195806 | Tralli+.18GROUPS ABS | 19900117 | EVL | | |
| A | 1 | 1 | N, X | EVL | 1USAGEN10020 | | 13 | D8 | Maxw | | R, APEX-467 | | 195806 | Tralli+.ONLY 2.23 MEV LINE FOR SNG | 19900117 | EVL | | |
| A | 1 | 1 | N, X | EVL | 1USAPCT11500 | | 13 | D+ | 2.5-02 | 1.4+07 | R, NP-8216 | | 195810 | Lamarsh+ ALL DATA | 19900117 | EVL | | |
| A | 1 | 1 | N, X | EVL | 1USAUNC10020 | | 13 | D8 | 4.1-02 | 1.8+07 | R, TID-21294 | | 196303 | Goldstein.TOT SEL | 19900117 | EVL | | |
| A | 1 | 1 | N, X | EVL | 1USAAI 10030 | | 13 | DC | 1.0-03 | 1.0+07 | R, NAA-SR-M-8904 | | 196308 | Alter+.TOT SCT NG | 19900117 | EVL | | |
| A | | | | | | | 23 | DC | 1.0+04 | 1.4+07 | R, NAA-SR-TDR-, 6545 | | 196106 | Alter.TABULATED TOT,SEL,SIN | 19900117 | EVL | | |
| A | | | | | | | 33 | DC | 1.0+00 | 1.0+07 | R, NAA-SR-TDR-, 5861 | | 196011 | Alter.TABULATED TOT,SEL,SIN.MTECARLO | 19900117 | EVL | | |
| A | 1 | 1 | N, TOT | CS | 1USACOL10010 | | 13 | E2 | Maxw | | J, PR, 48, 265 | | 193508 | Dunning+ IONCH,TRANS,SIG SLOW+FAST N | 19900117 | TOT | | |
| A | | | | | | | 26 | E2 | Maxw | | 4, EXFOR12634.002 | | 198403 | .1 PT. SIGMA. | 19900117 | TOT | | |
| A | 1 | 1 | N, TOT | CS | 1USAPTN10010 | | 12 | E2 | 2.4+06 | | J, PR, 52, 911 | | 193711 | Ladenburg+ TRANSMISSION, D-D NEUTS | 19900117 | TOT | | |
| A | | | | | | | 23 | EC | 2.4+06 | | J, PR, 52, 1255 | | 193712 | .FURTHER ANALYSIS | 19900117 | TOT | | |
| A | | | | | | | 36 | E+ | 2.4+06 | | 4, EXFOR13790.002 | | 200208 | .1 PT. SIGMA. | 200208 | 12 | | |
| A | 1 | 1 | N, TOT | CS | 1USABRK10010 | | 13 | E2 | Maxw | 2.5-02 | J, PR, 55, 339 | | 193902 | Libby+ ORTHO+P-HYDROGEN, GAS TRANS | 19900117 | TOT | | |
| A | | | | | | | 26 | E+ | 2.5-02 | | 4, EXFOR13789.002 | | 200208 | .1 PT. SIGMA. | 200208 | 12 | | |
| A | 99255 | 0 | F | FY | 3INDTRM34190 | | 13 | R | Spon | | J, PRM, 33, 109 | | 198907 | Prakash. GRPH:SCHEMATIC A-DIST,CFD | 19900516 | NFY | | |
| A | | | | | | | -18R | \$23-V-66 | 24-CR-68/69/70 | 25-MN-68/69 | 26-FE-67/68/70 | 27-CO-70/72/75 | | | 19900516 | NFY | | |
| A | | | | | | | -28R | \$28-NI-70/71/72 | 29-CU-68/68M/70/70M | 30-ZN-71/71M/72/73 | | | | | 19900516 | NFY | | |
| A | | | | | | | -39R | \$3INDTAT | 3INDDLH | | | | | | 19900516 | NFY | | |
| A | 99255 | N | 0 | RP | 4CCPFEI44130 | | 13 | T0 | 2.0+06 | 4.0+06 | J, YF, 39, 281 | | 198402 | Kupriyanov+ SYSTEMATCS.TBL AVG WN/WF | 19850319 | RES | | |
| A | | | | | | | 24 | T\$ | 2.0+06 | 4.0+06 | J, SNP, 39, 176 | | 198402 | .ENGLISH OF YF 39 281 | 19850319 | RES | | |

Appendix 2. EXTENSIONS

1) LONG-LINE

| Operation Code | Z | A | Meta | Reaction | Quantity | Lab | Block # | Seq. # | Work -type | Reader | E-min | E-max | Hierarchy | Reference | Date-ref | Comment | Date-mod | Old Quantity |
|----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|--------------------|-----------|-----------|----------------------|-----------|--------------|
| I3 | I3A | | | A15 | A3 | A6 | A5 | I2AA | AA | | A7 | A7 | I | A23 | I6 | A38 | | A8 |
| 1 | 1 | 1 | 1 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 |
| a | 0 | 1 | N, TOT | | CS | 1USAPTNI | 17730 | 1EC | | | 7.0+08 | 3.6+09 | J, PR/D, 8, 136 | 197307 | Devlin+ | MOM = 0.7-3.6 GEV/C. | 19900117 | TOT |
| a | 0 | 1 | N, TOT | | CS | 1USAPTNI | 17730 | 2EC | | | 7.0+08 | 3.6+09 | 64, EXFOR10365.005 | 198304 | .26 PTS. | SIGMA. | 19900117 | TOT |
| a | 0 | 1 | N, TOT | | CS | 1USAPTNI | 17730 | 3EC | | | 7.0+08 | 3.6+09 | 64, EXFOR10365.004 | 198304 | .26 PTS. | SIGMA. N-P + N-N. | 19900117 | TOT |

2a) BLOCK

| Block-Flag | Z | A | Meta | Reaction | Quantity | Lab | Block # |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| I3 | I3A | | | A15 | A3 | A6 | A5 |
| 1 | 1 | 1 | 1 | 10 | 10 | 10 | 10 |
| 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 |
| B | 1 | 1 | N, TOT | | CS | 1USAPTNI | 10010 |

2b) SHORT-LINE

| Operation Code | Seq. # | Work -type | Reader | E-min | E-max | Hierarchy | Reference | Date-ref | Comment | Date-mod | Old Quantity |
|----------------|-----------|------------|-----------|--------------------|-----------|-----------|------------------|-------------------------|-----------|-----------|--------------|
| I3AA | | A7 | A7 | I | A23 | I6 | A38 | | A8 | | |
| 1 | 1 | 1 | 1 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 | 123456789 |
| a | 1E2 | 2.4+06 | | 2J, PR, 52, 911 | | 193711 | Ladenburg+ | TRANSMISSION, D-D NEUTS | 19900117 | TOT | |
| a | 2EC | 2.4+06 | | 3J, PR, 52, 1255 | | 193712 | FURTHER ANALYSIS | 19900117 | TOT | | |
| a | 3E+ | 2.4+06 | | 64, EXFOR13790.002 | | 200208 | .1 PT. SIGMA. | 20020812 | TOT | | |

| Extension Flag | Keyword | Contents |
|----------------|-----------|---|
| A10 | A87 | |
| 1 | 1 | 10 |
| 123456789 | 123456789 | 123456789 |
| + | Author | R.Ladenburg, M.H.Kanner |
| + | Title | On the Neutrons from the Deuteron-Deuteron Reaction |

3) Line Extensions

Example 1. Long-Lines only.

```
A 0 1 N,TOT      CS 1USAPTN17730 1EC 7.0+08 3.6+093J,PR/D,8,136      197307Devlin+ MOM = 0.7-3.6 GEV/C.      19900117TOT
A 0 1 N,TOT      CS 1USAPTN17730 2EC 7.0+08 3.6+0964,EXFOR10365.005      198304.26 PTS. SIGMA.      19900117TOT
A 0 1 N,TOT      CS 1USAPTN17730 3EC 7.0+08 3.6+0964,EXFOR10365.004      198304.26 PTS. SIGMA. N-P + N-N.      19900117TOT
```

Example 2. Three CINDA-Lines: Common Block-Line and its 3 Short-Lines

```
B 1 1 N,TOT      CS 1USAPTN10010
a 1E2 2.4+06      2J,PR,52,911      193711Ladenburg+ TRANSMISSION, D-D NEUTS      19900117TOT
a 2EC 2.4+06      3J,PR,52,1255      193712.FURTHER ANALYSIS      19900117TOT
a 3E+ 2.4+06      64,EXFOR13790.002      200208.1 PT. SIGMA.      20020812TOT
```

Example 3. The same three lines as in Example-2 with extensions:

- Block has an additional Institute-code,

- Line #1 has Authors list and Title

```
B 1 1 N,TOT      CS 1USAPTN10010
+Institute 1USARUT
a 1E2 2.4+06      2J,PR,52,911      193711Ladenburg+ TRANSMISSION, D-D NEUTS      19900117TOT
+Author      R.Ladenburg, M.H.Kanner
+Title      On the Neutrons from the
+           Deuteron-Deuteron Reaction
a 2EC 2.4+06      3J,PR,52,1255      193712.FURTHER ANALYSIS      19900117TOT
a 3E+ 2.4+06      64,EXFOR13790.002      200208.1 PT. SIGMA.      20020812TOT
```

Reply to CP-D/413 by V. McLane:

Viktor,

Regarding your proposed updates.

1) If it is really true that there are more than 99 subentries for the same REACTINO string, then, we would need to extend the sequence number field to three in order to be able to link to the file from CINDA. (I really hope this is not true as it will be very inconvenient for users).

2) Sounds ok.

3) Don't understand this?

4) This shouldn't be needed as it can easily be done by a dictionary.

However, it may be a good idea when translating lines for which there are no EXFOR entries, and for which the quantity is ambiguous, to put in the old CINDA quantity. Where there is an EXFOR line, the quantity can be filled in from EXFOR.

5) This is always allowed on output. For input, I think we need it, since the lines are usually input one at a time. That is, a reference is entered; then some time later perhaps another reference is added; then still later an EXFOR line.

EXTENSIONS: I'm not completely sure about the need for extensions. We will talk about them at the meeting.

I hope in the future we will link to NSR and not need authors and titles in CINDA. Also, only the author and title of the first reference are in EXFOR.

Vicki

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