**Nuclear Data Section**

**International Atomic Energy Agency**

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**Memo CP-D/1095**

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**To:** Distribution

**From:** N. Otsuka

**Subject: EXFOR completeness for cross section data for space radiation protection**

A recent publication by M.S. Smith et al. [1] discusses databases, dissemination, and compilation of nuclear reaction data in the relation with radiation protection of astronauts and electronic devices exposed by galactic cosmic rays (GCR). The following figure (reproduced from T.C.Slaba et al. [2]) shows fraction of doses caused by various ions up to Z~26 accelerated up to ~10 GeV/u.



Collection of experimental cross sections helps validation of transport codes (e.g., Geant4, PHITS) applied to space radiation protection as well as heavy-ion therapy. Smith et al. introduce the following two compilations of cross sections for space research:

1. GSI-ESA-NASA database [3] (1,786 cross section data from 103 publications): This is an excellent compilation of angular and energy integrated cross sections such as total reaction cross sections (SF3=NON) and total charge changing cross sections (SF3=TCC). Not only the reaction and cross section but also data description (e.g., doi, sample thickness, facility, uncertainty type) are nicely tabulated in a simple form. The website (<https://bioapp.gsi.de/cross-section-db/>) provides retrieval function, but one can also download the whole database in EXCEL, CSV etc.
2. NUCDAT database [4] (~50,000 *entries*): This covers partial cross sections and differential cross sections including those expressed by relativistic kinematic variables such as rapidity and transverse mass. An index (e.g., projectile, incident energy, target, fragment nuclide, quantity) of this database is shown in the full description of the database [5]. I cannot find this database on the internet, and it is not clear for me if this database provides numerical data or index only.

Many datasets compiled in these databases are for projectile heavier than A=13 or projectile energy higher than 1 GeV (category B defined in the NRDC Protocol), and we do not guarantee their completeness in EXFOR. However, all CPND centres (other than NEA DB) compile the newly published heavy-ion induced reaction data, and it would be of our interest to see to what extent EXFOR is complete for space application. In the analysis discussed in this memo,

* An article reporting both categories A and B data was treated as a category A article.
* The upper boundary energy for the category A was set to 1 GeV/u rather than to 1 GeV).
* The quantity involving a independent or dependent variable undefined in the dictionary (e.g., transverse mass, invariant cross section) is not for EXFOR compilation. (i.e., not EXFORable).

The following summary tables show the EXFOR coverage is 47% for the GSI-ESA-NASA database and 68% for the NUCDAT database.

Table 1. EXFOR coverage of articles compiled in the GSI-ESA-NASA database (“EUR A/B” means experiments performed in area 2 countries other than Japan under category A/B)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Total | USA | JPN | EUR (A) | EUR (B) | Rest |
| GSI-ESA-NASA DB | 103 | 38 | 22 | 20 | 14 | 9 |
| in X4 | 48 | 14 | 16 | 7 | 6 | 5 |
| missing in X4 | 55 | 24 | 6 | 13 | 8 | 4 |
| X4 coverage | **47%** | 37% | 73% | 35% | 43% | 56% |

Table 2. EXFOR coverage of articles compiled in NUCDAT database (See the table 1 caption for EUR A/B. “Total” means “EXFORable total”.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Total | USA | JPN | EUR (A) | EUR (B) | Rest |
| NUCDAT | 398 | 178 | 53 | 123 | 44 |
| in X4 | 270 | 102 | 47 | 84 | 38 |
| missing in X4 | 128 | 76 | 6 | 17 | 22 | 6 |
| X4 coverage | **68%** | 57% | 89% | 66% | 84% |

These tables are based on the full summary of my analysis summarized in the tables appended to this memo. (In these appendices, category “N” means not for EXFOR compilation.)

Table 3. Number of articles for compilation by each centre

|  |  |  |
| --- | --- | --- |
|  | Category A | Category B |
|  | GSI-ESA-NASA | NUCDAT | GSI-ESA-NASA | NUCDAT |
| NNDC | 8 | 27 | 16 | 49 |
| NEA DB | 13 | 17 | - | - |
| JCPRG | 1 | 3 | 2 | 3 |
| CNDC | 1 | 0 | 3 | 0 |
| CNPD | 1 | 0 | 1 | 7 |
| NDPCI | 0 | 0 | 1 | 0 |
| Any | - | - | 8 | 22 |
| Total | 24 | 47 | 31 | 81 |

**References**

[1] M.S. Smith, R.L. Vogt, K.A. Label, “Nuclear data for space exploration”, Font. Astron. Space. Sci. **10** (2023) 1228901 (doi: 10.3389/fspas.2023.1228901).

[2] T.C. Slaba, S.R. Blattnig, “GCR environmental models I: Sensitivity analysis for GCR environments”, Space Weather **12** (2014) 217 (doi: 10.1002/2013SW001025).

[3] F. Luoni et al., “Total nuclear reaction cross-section database for radiation protection in space and heavy-ion therapy applications”, New J. Phys. **23** (2021) 101201 (doi:10.1088/1367-2630/ac27e1).

[4] J.W. Norbury et al., “Nuclear data for space radiation”, Radiat. Meas. 47 (2012) 315 (doi: 10.1016/j.radmeas.2012.03.004)

[5] J.W. Norbury et al., “Review of nuclear physics experiments for space radiation”, Report NASA/TP-2011-217179, 2011.

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**Appendix 1: Comparison of GSI-ESA-NASA database with EXFOR**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Year** | **doi** | **EXFOR reference code** | **X4#** | **Lab** | **Cat.** | **Aprj,min** | **E,min (GeV/A)** | **Quantity** |
| Aksinenko | 1980 | [10.1016/0375-9474(80)90269-9](http://doi.org/10.1016/0375-9474%2880%2990269-9) | J,NP/A,348,518,1980 | O0779 | 4ZZZDUB | A | 4 | 7.2E-02 | TMC |
| Alcantara-Nunez | 2015 | [10.1103/PhysRevC.92.024607](http://doi.org/10.1103/PhysRevC.92.024607) | J,PR/C,92,024607,2015 | O1889 | 2GERGSI | B | 136 | 5.0E-01 | TMC |
| Alpat | 2013 | [10.1109/TNS.2013.2284855](http://doi.org/10.1109/TNS.2013.2284855) | J,IRE,60,4673,2013 |   | 2GERGSI | A | 12 | 5.0E-01 | TCC |
| Auce | 1996 | [10.1103/PhysRevC.53.2919](http://doi.org/10.1103/PhysRevC.53.2919) | J,PR/C,53,2919,1996 | A0604 | 2SWDUPP | A | 2 | 1.9E-02 | NON |
| Bilaniuk | 1981 | [10.1088/0305-4616/7/12/020](http://doi.org/10.1088/0305-4616/7/12/020) | J,JP/G,7,1699,1981 | D5003 | 4UKRIJD | A | 2 | 6.8E-03 | TCC |
| Binns | 1987 | [10.1103/PhysRevC.36.1870](http://doi.org/10.1103/PhysRevC.36.1870) | J,PR/C,36,1870,1987 |   | 1USABRK | B | 84 | 9.3E-01 | TCC |
| Bisheva | 1967 | [10.1016/0370-2693(67)90420-0](http://doi.org/10.1016/0370-2693%2867%2990420-0) | J,PL/B,24,533,1967 |   | 4RUSITE | A | 2 | 3.6E-01 | TCC |
| Blank | 1997 | [10.1016/S0375-9474(97)81837-4](http://doi.org/10.1016/S0375-9474%2897%2981837-4) | J,NP/A,624,242,1997 |   | 2GERGSI | A | 7 | 1.4E-01 | TMC |
| Bochkarev | 1998 | [10.1007/s100500050026](http://doi.org/10.1007/s100500050026) | J,EPJ/A,8,197,2000 |   | 2GERGSI | B | 20 | 9.5E-01 | TCC,TMC |
| Brechtmann | 1988 | [10.1016/0168-583X(88)90475-2](http://doi.org/10.1016/0168-583X%2888%2990475-2) | J,NIM/B,29,675,1988 | O1273 | 1USABRK | B | 32 | 7.2E-01 | TCC |
| Brechtmann | 1988 | [10.1007/BF01290126](http://doi.org/10.1007/BF01290126) | J,ZP/A,330,407,1988 |   | 2ZZZCER | B | 16 | 6.0E+01 | TCC |
| Brechtmann | 1988 | [10.1007/BF01291905](http://doi.org/10.1007/BF01291905) | J,ZP/A,331,463,1988 |   | 2ZZZCER+ | B | 32 | 7.0E-01 | TCC |
| Brechtmann | 1989 | [10.1103/PhysRevC.39.2222](http://doi.org/10.1103/PhysRevC.39.2222) | J,PR/C,39,2222,1989 |   | 1USABNL | B | 28 | 1.5E+01 | TCC |
| Brohm | 1995 | [10.1016/0375-9474(94)00507-J](http://doi.org/10.1016/0375-9474%2894%2900507-J) | J,NP/A,585,565,1995 |   | 2GERGSI | B | 46 | 5.0E-01 | TCC |
| Budzanowski | 1968 | [10.1016/0375-9474(67)90825-1](http://doi.org/10.1016/0375-9474%2867%2990825-1) | J,NP/A,106,21,1967 | D0530 | 3POLIFJ | A | 4 | 6.2E-03 | NON |
| Cai | 2002 | [10.1103/PhysRevC.65.024610](http://doi.org/10.1103/PhysRevC.65.024610) | J,PR/C,65,024610,2002 | D0546 | 3CPRIMP | B | 19 | 2.5E-02 | NON |
| Cecchini | 2008 | [10.1016/j.nuclphysa.2008.03.017](http://doi.org/10.1016/j.nuclphysa.2008.03.017) | J,NP/A,807,206,2008 | D0946 | 2JPNIRS+ | A | 12 | 2.9E-01 | TCC |
| Chen | 1994 | [10.1103/PhysRevC.49.3200](http://doi.org/10.1103/PhysRevC.49.3200) | J,PR/C,49,3200,1994 |   | 1USABRK | B | 22 | 3.4E-01 | TCC |
| Cheng | 2012 | [10.1088/1674-1137/36/1/006](http://doi.org/10.1088/1674-1137/36/1/006) | J,CPH/C,36,37,2012 |   | 2JPNIRS | B | 20 | 4.0E-01 | TCC |
| Cheshire | 1974 | [10.1103/PhysRevD.10.25](http://doi.org/10.1103/PhysRevD.10.25) | J,PR/D,10,25,1974 |   | 1USABRK | B | 12 | 2.1E+00 | TCC |
| Christie | 1993 | [10.1103/PhysRevC.48.2973](http://doi.org/10.1103/PhysRevC.48.2973) | J,PR/C,48,2973,1993 |   | 1USABRK | B | 139 | 1.2E+00 | TCC |
| Chulkov | 2000 | [10.1016/S0375-9474(00)00168-8](http://doi.org/10.1016/S0375-9474%2800%2900168-8) | J,NP/A,674,330,2000 |   | 2GERGSI | A | 10 | 7.2E-01 | TCC |
| DeVries | 1982 | [10.1103/PhysRevC.26.301](http://doi.org/10.1103/PhysRevC.26.301) | J,PR/C,26,301,1982 |   | 1USABRK | A | 4 | 8.7E-02 | TMC |
| Fang | 2000 | [10.1103/PhysRevC.61.064311](http://doi.org/10.1103/PhysRevC.61.064311) | J,PR/C,61,064311,2000 |   | 3CPRIMP | A | 12 | 2.1E-02 | TMC |
| Fang | 2001 | [10.1007/s100500170011](http://doi.org/10.1007/s100500170011) | J,EPJ/A,12,335,2001 |   | 3CPRIMP | B | 19 | 1.8E-02 | NON |
| Ferrando | 1988 | [10.1103/PhysRevC.37.1490](http://doi.org/10.1103/PhysRevC.37.1490) | J,PR/C,37,1490,1988 |   | 1USABRK | A | 12 | 4.3E-01 | TCC |
| Flesh | 2001 | [10.1016/S1350-4487(01)00158-5](http://doi.org/10.1016/S1350-4487%2801%2900158-5) | J,RM,34,237,2001 | O0971 | 2JPNIRS | B | 28 | 4.3E-01 | TCC |
| Fukuda | 1991 | [10.1016/0370-2693(91)91587-L](http://doi.org/10.1016/0370-2693%2891%2991587-L) | J,PL/B,268,339,1991 | E1468 | 2JPNIPC | A | 11 | 3.3E-02 | TMC |
| Fukuda | 1999 | [10.1016/S0375-9474(99)00308-5](http://doi.org/10.1016/S0375-9474%2899%2900308-5) | J,NP/A,656,209,1999 | E1903 | 2JPNIPC | A | 6 | 3.2E-02 | ABS,NON |
| Giot | 2013 | [10.1016/j.nuclphysa.2012.12.119](http://doi.org/10.1016/j.nuclphysa.2012.12.119) | J,NP/A,899,116,2013 | O2143 | 2GERGSI | B | 136 | 5.0E-01 | TMC |
| Goekmen | 1984 | [10.1103/PhysRevC.29.1595](http://doi.org/10.1103/PhysRevC.29.1595) | J,PR/C,29,1595,1984 |   | 1USAMRY | A | 4 | 1.2E-02 | TMC |
| Golovchenko | 2001 | [10.1016/S1350-4487(01)00171-8](http://doi.org/10.1016/S1350-4487%2801%2900171-8) | J,RM,34,297,2001 |   | 2JPNIRS | A | 12 | 3.2E-02 | TCC |
| Golovchenko | 2002 | [10.1103/PhysRevC.66.014609](http://doi.org/10.1103/PhysRevC.66.014609) | J,PR/C,66,014609,2002 | O1044 | 2JPNIRS | A | 12 | 1.1E-01 | TCC |
| Greiner | 1985 | [10.1103/PhysRevC.31.416](http://doi.org/10.1103/PhysRevC.31.416) | J,PR/C,31,416,1985 |   | 1USABRK | B | 238 | 9.0E-01 | TCC,CENT,F |
| Gupta | 2012 | [10.1016/j.radmeas.2012.07.007](http://doi.org/10.1016/j.radmeas.2012.07.007) | J,RM,47,1023,2012 |   | 1USABNL | B | 56 | 3.0E-01 | TCC |
| Gupta | 2013 | [10.1140/epja/i2013-13098-3](http://doi.org/10.1140/epja/i2013-13098-3) | J,EPJ/A,49,98,2013 |   | 2JPNIRS | B | 28 | 6.0E-01 | TCC |
| Gupta | 2013 | [10.1016/j.radphyschem.2013.07.012](http://doi.org/10.1016/j.radphyschem.2013.07.012) | J,RPC,92,8,2013 |   | 1USABNL | B | 28 | 5.0E+00 | TCC |
| He | 1994 | [10.1007/BF01289597](http://doi.org/10.1007/BF01289597) | J,ZP/A,348,105,1994 |   | 1USABNL | B | 197 | 1.1E+01 | TCC |
| Hirzebruch | 1992 | [10.1103/PhysRevC.46.1487](http://doi.org/10.1103/PhysRevC.46.1487) | J,PR/C,46,1487,1992 |   | 1USABNL | B | 16 | 9.0E-01 | TCC |
| Hirzebruch | 1993 | [10.1016/0168-583X(93)95950-A](http://doi.org/10.1016/0168-583X%2893%2995950-A) | J,NIM/B,74,519,1993 |   | 1USABNL | B | 197 | 1.1E+01 | TCC |
| Hirzebruch | 1995 | [10.1103/PhysRevC.51.2085](http://doi.org/10.1103/PhysRevC.51.2085) | J,PR/C,51,2085,1995 |   | 1USABNL | B | 197 | 1.0E+01 | TCC |
| Horst | 2017 | [10.1103/PhysRevC.96.024624](http://doi.org/10.1103/PhysRevC.96.024624) | J,PR/C,96,024624,2017 | O2435 | 2GERHEI | A | 4 | 8.4E-02 | TCC,TMC |
| Horst | 2019 | [10.1103/PhysRevC.99.014603](http://doi.org/10.1103/PhysRevC.99.014603) | J,PR/C,99,014603,2019 | O2441 | 2GERHEI | A | 4 | 7.1E-02 | TCC,TMC |
| Horst | 2021 | [10.1088/1361-6560/abef88](http://doi.org/10.1088/1361-6560/abef88) | J,PMB,66,095009,2021 |   | 2GERGSI | A | 3 | 2.0E-01 | NON |
| Hostachy | 1987 | [10.1016/0370-2693(87)90557-0](http://doi.org/10.1016/0370-2693%2887%2990557-0) | J,PL/B,184,139,1987 |   | 2FR SAT | A | 12 | 1.2E-01 | TMC |
| Iancu | 2005 | [10.1016/j.radmeas.2004.10.011](http://doi.org/10.1016/j.radmeas.2004.10.011) | J,RM,39,525,2005 | O1271 | 2GERGSI | B | 36 | 3.2E-01 | TCC |
| Igo | 1963 | [10.1103/PhysRev.131.1251](http://doi.org/10.1103/PhysRev.131.1251) | J,PR,131,1251,1963 |   | 1USABRK | A | 4 | 1.0E-02 | TMC |
| Ingemarsson | 2000 | [10.1016/S0375-9474(00)00200-1](http://doi.org/10.1016/S0375-9474%2800%2900200-1) | J,NP/A,676,3,2000 | D0186 | 2SWDUPP | A | 4 | 1.7E-02 | TMC |
| Ingemarsson | 2001 | [10.1016/S0375-9474(01)01116-2](http://doi.org/10.1016/S0375-9474%2801%2901116-2) | J,NP/A,696,3,2001 | D0185 | 2SWDUPP | A | 3 | 3.2E-02 | NON |
| Jaros | 1978 | [10.1103/PhysRevC.18.2273](http://doi.org/10.1103/PhysRevC.18.2273) | J,PR/C,18,2273,1978 | O0744 | 1USABRK | A | 2 | 8.7E-01 | TMC |
| Jun-Sheng Li | 2016 | [10.1016/j.cjph.2016.05.003](http://doi.org/10.1016/j.cjph.2016.05.003) | J,CHP,54,314,2016 | E2541 | 2JPNIRS | B | 28 | 7.9E-01 | TCC |
| Kobayashi | 1992 | [10.1016/0375-9474(92)90784-H](http://doi.org/10.1016/0375-9474%2892%2990784-H) | J,NP/A,538,343,1992 |   | 1USABRK | A | 11 | 4.0E-01 | TMC |
| Kox | 1984 | [10.1016/0375-9474(84)90663-8](http://doi.org/10.1016/0375-9474%2884%2990663-8) | J,NP/A,420,162,1984 | O0776 | 2ZZZCER+ | A | 12 | 3.0E-02 | TCC |
| Kox | 1987 | [10.1103/PhysRevC.35.1678](http://doi.org/10.1103/PhysRevC.35.1678) | J,PR/C,35,1678,1987 |   | 2FR SAT+ | A | 12 | 9.3E-03 | TMC |
| Labie | 1973 | [10.1016/0375-9474(73)90121-8](http://doi.org/10.1016/0375-9474%2873%2990121-8) | J,NP/A,205,81,1973 |   | 2BLGLVN | A | 4 | 3.9E-03 | TMC |
| Matsuoka | 1980 | [10.1016/0375-9474(80)90409-1](http://doi.org/10.1016/0375-9474%2880%2990409-1) | J,NP/A,345,1,1980 | E1970 | 2JPNOSA | A | 2 | 2.8E-02 | TMC |
| Mayo | 1965 | [10.1016/0029-5582(65)90487-6](http://doi.org/10.1016/0029-5582%2865%2990487-6) | J,NP,62,393,1965 | D0223 | 3ARGCNE | A | 2 | 1.2E-02 | NON |
| Millburn | 1954 | [10.1103/PhysRev.95.1268](http://doi.org/10.1103/PhysRev.95.1268) | J,PR,95,1268,1954 | C1218 | 1USABNL | A | 2 | 6.0E-02 | TCC |
| Napolitani | 2007 | [10.1103/PhysRevC.76.064609](http://doi.org/10.1103/PhysRevC.76.064609) | J,PR/C,76,064609,2007 | O1589 | 2GERGSI | B | 136 | 1.0E+00 | TMC |
| Neumaier | 2002 | [10.1016/S0375-9474(02)01274-5](http://doi.org/10.1016/S0375-9474%2802%2901274-5) | J,NP/A,712,247,2002 | A0493 | 2GERGSI | A | 4 | 6.7E-01 | TMC |
| Nilsen | 1995 | [10.1103/PhysRevC.52.3277](http://doi.org/10.1103/PhysRevC.52.3277) | J,PR/C,52,3277,1995 |   | 1USABRK | B | 84 | 4.4E-01 | TCC |
| Obuti | 1996 | [10.1016/0375-9474(96)00267-9](http://doi.org/10.1016/0375-9474%2896%2900267-9) | J,NP/A,609,74,1996 | E2016 | 1USABRK | A | 8 | 7.9E-01 | TMC |
| Ozawa | 1994 | [10.1016/0370-2693(94)90585-1](http://doi.org/10.1016/0370-2693%2894%2990585-1) | J,PL/B,334,18,1994 | E2013 | 1USABRK | B | 17 | 6.2E-01 | TMC |
| Ozawa | 1995 | [10.1016/0375-9474(94)00763-D](http://doi.org/10.1016/0375-9474%2894%2900763-D) | J,NP/A,583,807,1995 | E2014 | 1USABRK | A | 11 | 6.7E-01 | TMC |
| Ozawa | 1996 | [10.1016/0375-9474(96)00241-2](http://doi.org/10.1016/0375-9474%2896%2900241-2) | J,NP/A,608,63,1996 | E2015 | 1USABRK | A | 9 | 6.5E-01 | TMC |
| Ozawa | 2001 | [10.1016/S0375-9474(01)00563-2](http://doi.org/10.1016/S0375-9474%2801%2900563-2) | J,NP/A,691,599,2001 |   | 2GERGSI | A | 10 | 9.1E-01 | TMC |
| Ozawa | 2014 | [10.1103/PhysRevC.89.044602](http://doi.org/10.1103/PhysRevC.89.044602) | J,PR/C,89,044602,2014 | E2455 | 2JPNIPC | B | 30 | 2.3E-01 | TCC |
| Paradela | 2017 | [10.1103/PhysRevC.95.044606](http://doi.org/10.1103/PhysRevC.95.044606) | J,PR/C,95,044606,2017 | O2407 | 2GERGSI | B | 136 | 2.0E-01 | TMC |
| Perrin | 1982 | [10.1103/PhysRevLett.49.1905](http://doi.org/10.1103/PhysRevLett.49.1905) | J,PRL,49,1905,1982 |   | 2ZZZCER | A | 12 | 9.3E-03 | TMC |
| Powers | 1966 | [10.1103/PhysRev.152.1096](http://doi.org/10.1103/PhysRev.152.1096) | J,PR,152,1096,1966 | C2324 | 1USAANL | A | 4 | 5.0E-03 | TMC |
| Price | 1991 | [10.1103/PhysRevC.43.835](http://doi.org/10.1103/PhysRevC.43.835) | J,PR/C,43,835,1991 |   | 1USABNL | B | 28 | 1.5E+01 | TCC |
| Saint Laurent | 1989 | [10.1007/BF01292431](http://doi.org/10.1007/BF01292431) | J,ZP/A,332,457,1989 |   | 2FR GRE | A | 4 | 1.6E-02 | TMC |
| Sampsonidis | 1995 | [10.1103/PhysRevC.51.3304](http://doi.org/10.1103/PhysRevC.51.3304) | J,PR/C,51,3304,1995 |   | 4ZZZDUB | B | 16 | 3.7E+00 | TCC |
| Schall | 1996 | [10.1016/0168-583X(96)00325-4](http://doi.org/10.1016/0168-583X%2896%2900325-4) | J,NIM/B,117,221,1996 |   | 2GERGSI | A | 10 | 1.9E-01 | TCC |
| Shapira | 1982 | [10.1103/PhysRevC.26.2470](file:///C%3A%5CUsers%5Cotsukan%5CAppData%5CLocal%5CMicrosoft%5CWindows%5CMy%20Documents%5C10.1103%5CPhysRevC.26.2470) | J,PR/C,26,2470,1982 |   | 1USAORL | B | 20 | 3.0E-03 | NON |
| Singh | 1992 | [10.1007/BF01291023](http://doi.org/10.1007/BF01291023) | J,ZP/A,344,73,1992 |   | 2ZZZCER+ | B | 16 | 1.5E+01 | TCC |
| Suzuki | 1995 | [10.1103/PhysRevLett.75.3241](http://doi.org/10.1103/PhysRevLett.75.3241) | J,PRL,75,3241,1995 |   | 2GERGSI | B | 20 | 9.5E-01 | TMC |
| Suzuki | 1999 | [10.1063/1.57311](file:///C%3A%5CUsers%5Cotsukan%5CAppData%5CLocal%5CMicrosoft%5CWindows%5CMy%20Documents%5Chttp%3A%5Cdoi.org%5C10.1063%5C1.57311) | S,AIP-455,84,1998 |   | 2GERGSI | B | 14 | 7.4E-01 | TMC |
| Takechi | 2009 | [10.1103/PhysRevC.79.061601](http://doi.org/10.1103/PhysRevC.79.061601) | J,PR/C,79,061601,2009 | E2149 | 2JPNIRS | A | 12 | 3.3E-02 | TMC |
| Tanihata | 1985 | [10.1007/BF02061988](http://doi.org/10.1007/BF02061988) | J,HI,21,251,1985 |   | 1USABRK | A | 4 | 7.9E-01 | TMC |
| Tanihata | 1985 | [10.1016/0370-2693(85)90005-X](http://doi.org/10.1016/0370-2693%2885%2990005-X) | J,PL/B,160,380,1985 | E2011 | 1USABRK | A | 3 | 7.9E-01 | TMC |
| Tanihata | 1985 | [10.1103/PhysRevLett.55.2676](http://doi.org/10.1103/PhysRevLett.55.2676) | J,PRL,55,2676,1985 | E1174 | 1USABRK | A | 6 | 7.9E-01 | TMC |
| Tanihata | 1988 | [10.1016/0370-2693(88)90702-2](http://doi.org/10.1016/0370-2693%2888%2990702-2) | J,PL/B,206,592,1988 | E1262 | 1USABRK | A | 8 | 7.9E-01 | TMC |
| Tanihata | 1992 | [10.1016/0370-2693(92)90988-G](http://doi.org/10.1016/0370-2693%2892%2990988-G) | J,PL/B,287,307,1992 | E2012 | 1USABRK | A | 11 | 4.0E-01 | TMC |
| Togo | 2007 | [10.1016/j.nima.2007.05.017](http://doi.org/10.1016/j.nima.2007.05.017) | J,NIM/A,580,58,2007 |   | 2ZZZCER+ | B | 28 | 4.1E-01 | TCC |
| Toshito | 2007 | [10.1103/PhysRevC.75.054606](http://doi.org/10.1103/PhysRevC.75.054606) | J,PR/C,75,054606,2007 | E2053 | 2JPNIRS | A | 12 | 2.1E-01 | TCC |
| Tran | 2016 | [10.1103/PhysRevC.94.064604](http://doi.org/10.1103/PhysRevC.94.064604) | J,PR/C,94,064604,2016 | E2526 | 2JPNOSA | A | 12 | 3.8E-02 | TCC |
| Wang | 2019 | [10.1007/s41365-019-0704-1](http://doi.org/10.1007/s41365-019-0704-1) | J,CNST,30,186,2019 |   | 2JPNIRS | B | 56 | 4.6E-01 | TCC |
| Warner | 1996 | [10.1103/PhysRevC.54.1700](http://doi.org/10.1103/PhysRevC.54.1700) | J,PR/C,54,1700,1996 | C0919 | 1USAMSU | A | 4 | 1.2E-02 | TMC |
| Webber | 1982 | [10.1086/160308](file:///C%3A%5CUsers%5Cotsukan%5CAppData%5CLocal%5CMicrosoft%5CWindows%5CMy%20Documents%5C%20http%3A%5Cdoi.org%5C10.1086%5C160308) | J,AJ,260,894,1982 |   | 1USABRK | B | 56 | 6.5E-01 | TCC |
| Webber | 1990 | [10.1103/PhysRevC.41.520](http://doi.org/10.1103/PhysRevC.41.520) | J,PR/C,41,520,1990 |   | 1USABRK | A | 12 | 3.0E-01 | TCC,TMC |
| Webber | 1998 | [10.1086/306445](http://doi.org/10.1086/306445) | J,AJ,508,940,1998 |   | 2FR SAT | A | 7 | 3.5E-01 | TCC |
| Webber | 1998 | [10.1103/PhysRevC.58.3539](http://doi.org/10.1103/PhysRevC.58.3539) | J,PR/C,58,3539,1998 |   | 2FR SAT | A | 6 | 5.0E-01 | TCC |
| Westfall | 1979 | [10.1103/PhysRevC.19.1309](http://doi.org/10.1103/PhysRevC.19.1309) | J,PR/C,19,1309,1979 | C0407 | 2GERGSI | B | 56 | 1.9E+00 | TCC,TMC |
| Wilkins | 1962 | <http://escholarship.org/uc/item/23x9v996> | R,UCRL-10500,1962 |   | 1USABRK | A | 2 | 1.1E-02 | NON |
| Yamaguchi | 2010 | [10.1103/PhysRevC.82.014609](http://doi.org/10.1103/PhysRevC.82.014609) | J,PR/C,82,014609,2010 | E2283 | 2JPNIRS | B | 28 | 9.0E-02 | TCC |
| Yamaguchi | 2011 | [10.1103/PhysRevLett.107.032502](http://doi.org/10.1103/PhysRevLett.107.032502) | J,PRL,107,032502,2011 | E2349 | 2JPNIRS | A | 9 | 2.8E-01 | TCC |
| Zeitlin | 2001 | [10.1103/PhysRevC.64.024902](http://doi.org/10.1103/PhysRevC.64.024902) | J,PR/C,64,024902,2001 |   | 2JPNIRS | B | 20 | 5.5E-01 | TCC |
| Zeitlin | 2007 | [10.1016/j.nuclphysa.2006.10.088](http://doi.org/10.1016/j.nuclphysa.2006.10.088) | J,NP/A,784,341,2007 | E2010 | 2JPNIRS+ | B | 28 | 2.7E-01 | TCC |
| Zeitlin | 2007 | [10.1103/PhysRevC.76.014911](http://doi.org/10.1103/PhysRevC.76.014911) | J,PR/C,76,014911,2007 | C1581 | 2JPNIRS | A | 12 | 2.9E-01 | TCC |
| Zeitlin | 2008 | [10.1103/PhysRevC.77.034605](http://doi.org/10.1103/PhysRevC.77.034605) | J,PR/C,77,034605,2008 | C1609 | 1USABNL+ | B | 35 | 2.9E-01 | TCC |
| Zeitlin | 2011 | [10.1103/PhysRevC.83.034909](http://doi.org/10.1103/PhysRevC.83.034909) | J,PR/C,83,034909,2011 |   | 2JPNIRS+ | B | 14 | 2.9E-01 | TCC |
| Zhang | 2012 | [10.1016/j.nimb.2012.01.058](http://doi.org/10.1016/j.nimb.2012.01.058) | J,NIM/B,286,238,2012 | E2386 | 2JPNIRS | B | 20 | 3.9E-01 | TCC |

**Appendix 2: Comparison of NUCDAT database with EXFOR**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Year** | **doi** | **EXFOR reference code** | **X4#** | **Lab** | **Cat.** | **Status** | **Remark** |
| Abdurakhimov | 1981 | 10.1016/0375-9474(81)90500-5 | J,NP/A,362,376,1981 |   | 4ZZZDUB | B | Table | Projectile fragmentation cross section |
| Abe | 1987 | 10.1016/0375-9474(87)90552-5 | J,NP/A,462,358,1987 | E1366 | 2JPNTOH+ |   |   |   |
| Abe | 1987 | 10.1016/0375-9474(87)90347-2 | J,NP/A,466,109,1987 | E1364 | 2JPNTOH |   |   |   |
| Abramov | 2010 | 10.3103/S1062873810040301 | J,BAS,74,564,2010 |   |   | N |   | Invariant cross section in arbitrary units |
| Aksinenko | 1980 | 10.1016/0375-9474(80)90269-9 | J,NP/A,348,518,1980 | O0779 | 4ZZZDUB |   |   |   |
| Aladashvili | 1981 |   | J,ASL,31,29,1981 |   | 4ZZZDUB? | N | Table | Exclusive cross sections from 4He+p for many channels |
| Alard | 1975 | 10.1007/BF02730175 | J,NC/A,30,320,1975 | O0046 | 2ZZZCER |   |   |   |
| Alexakhin | 2000 | 10.1134/1.1320136 | J,PAN,63,1673,2000 | F0776 | 4ZZZDUB |   |   |   |
| Alexander | 1963 | 10.1103/PhysRev.129.1826 | J,PR,129,1826,1963 | C0374 | 1USABRK |   |   |   |
| Alvarez-Pol | 2010 | 10.1103/PhysRevC.82.041602 | J,PR/C,82,041602,2010 | D0607 | 2GERGSI |   |   |   |
| Anderson | 1983 | 10.1103/PhysRevC.28.1224 | J,PR/C,28,1224,1983 |   | 1USABRK | N | Curve | Invariant spectrum |
| Anikina | 1983 |   | J,SNP,38,88,1983 |   | 4ZZZDUB | B | Table |   |
| Apollonio | 2010 | 10.1103/PhysRevC.82.045208 | J,PR/C,82,045208,2010 |   | 2ZZZCER | B | Table |   |
| Armbruster | 2004 | 10.1103/PhysRevLett.93.212701 | J,PRL,93,212701,2004 |   | 2GERGSI |   |   | Review |
| Asano | 1985 | 10.1143/JPSJ.54.3734 | J,JPJ,54,3734,1985 | E1241 | 2JPNLEP |   |   |   |
| Asano | 1988 | 10.1143/JPSJ.57.2995 | J,JPJ,57,2995,1988 | E1240 | 2JPNKEK |   |   |   |
| Auble | 1983 | 10.1103/PhysRevC.28.1552 | J,PR/C,28,1552,1983 |   | 1USABRK | B | Curve |   |
| Audouin | 2006 | 10.1016/j.nuclphysa.2006.01.006 | J,NP/A,768,1,2006 | O1304 | 2GERGSI |   |   |   |
| Austrin | 1962 | 10.1088/0370-1328/80/2/305 | J,PPS,80,383,1962 |   | 2UK HAR | A | Table |   |
| Avan | 1984 | 10.1103/PhysRevC.30.521 | J,PR/C,30,521,1984 | O0145 | 2FR PAR |   |   |   |
| Avdeyev | 2002 | 10.1016/S0375-9474(02)01028-X | J,NP/A,709,392,2002 |   | 4ZZZDUB | N | Curve | Yield in arbitrary units |
| Awes | 1979 | 10.1016/0370-2693(79)90013-3 | J,PL/B,87,43,1979 |   | 1USABRK | N | Curve | Energy spectrum in arbitrary units |
| Awes | 1980 | 10.1103/PhysRevLett.45.513 | J,PRL,45,513,1980 |   | 1USABRK | N | Curve | Double differential spectrum per fission event |
| Awes | 1981 | 10.1103/PhysRevC.24.89 | J,PR/C,24,89,1981 |   | 1USABRK | N | Curve | Double differential spectrum per fission event |
| Badalà | 1993 | 10.1103/PhysRevC.48.633 | J,PR/C,48,633,1993 |   | 2FR GAN | N | Curve | Energy and angular distribution in arbitrary units |
| Badran | 2001 | 10.1007/s100500170009 | J,EPJ/A,12,317,2001 | O1612 | 2UK HAR |   |   |   |
| Baker | 1958 | 10.1103/PhysRev.112.1319 | J,PR,112,1319,1958 | C0255 | 1USABNL |   |   | FACILITY: Must be (SYNCH,1USABNL). |
| Banaigs | 1987 | 10.1103/PhysRevC.35.1416 | J,PR/C,35,1416,1987 |   | 2FR SAT | B | Table | Numerical data available as PAPS PRVCA-35-1416-101 |
| Bandyopadhyay | 2002 | 10.1140/epja/iepja1269 | J,EPJ/A,14,53,2002 | D0205 | 3INDTRM |   |   |   |
| Barrette | 1995 | 10.1103/PhysRevC.52.956 | J,PR/C,52,956,1995 |   | 1USABNL | B | Table |   |
| Barrette | 2000 | 10.1103/PhysRevC.61.044906 | J,PR/C,61,044906,2000 |   | 1USABNL | N | Curve | Transverse momentum distribution |
| Bastid | 1990 | 10.1016/0375-9474(90)90207-3 | J,NP/A,506,637,1990 |   | 2FR SAT | B | Curve | dsigma/dOmega/d(p/A) |
| Basu | 2007 | 10.1103/PhysRevC.76.034609 | J,PR/C,76,034609,2007 | D6055 | 3INDNSD |   |   |   |
| Batzel | 1954 | 10.1103/PhysRev.93.280 | J,PR,93,280,1954 | D4101 | 1USABRK |   |   |   |
| Bazin | 1990 | 10.1016/0375-9474(90)90372-S | J,NP/A,515,349,1990 |   | 2FR GAN | N | Curve | Production cross section in arbitrary units |
| Beck | 1976 |   | R,NASA-TN-D-8119,1976 | O0664 | 1USASRE |   |   |   |
| Beene | 1981 | 10.1103/PhysRevC.23.2463 | J,PR/C,23,2463,1981 |   | 1USAORL | B | Table |   |
| Benenson | 1967 | 10.1016/0375-9474(67)90516-7 | J,NP/A,97,510,1967 | O0241 | 1USAMSU |   |   |   |
| Benioff | 1960 | 10.1103/PhysRev.119.316 | J,PR,119,316,1960 | C0220 | 1USABRK |   |   |   |
| Benlliure | 1998 | 10.1007/s100500050108 | J,EPJ/A,2,193,1998 | A0084 | 2GERGSI |   |   |   |
| Benlliure | 1999 | 10.1016/S0375-9474(99)00386-3 | J,NP/A,660,87,1999 | A0102 | 2GERGSI |   |   |   |
| Benlliure | 2001 | 10.1016/S0375-9474(00)00472-3 | J,NP/A,683,513,2001 | O0783 | 2GERGSI |   |   |   |
| Benlliure | 2002 | 10.1016/S0375-9474(01)01331-8 | J,NP/A,700,469,2002 |   | 2GERGSI | B | Curve |   |
| Benlliure | 2010 | 10.48550/arXiv.1004.0265 | X,ARXIV.1004.0265,2010 |   | 2GERGSI | N |   | No original measured data given |
| Bernas | 1965 | 10.1016/0031-9163(65)91317-X | J,PL/B,15,147,1965 |   | 2FR PAR+ | A | Table |   |
| Bernas | 1967 | 10.1016/0003-4916(67)90100-5 | J,AP,44,426,1967 |   |   | N |   | Review |
| Bernas | 1997 | 10.1016/S0370-2693(97)01216-1 | J,PL/B,415,111,1997 | O1014 | 2GERGSI |   |   |   |
| Bernas | 2003 | 10.1016/S0375-9474(03)01576-8 | J,NP/A,725,213,2003 | O1069 | 2GERGSI |   |   |   |
| Bernas | 2006 | 10.1016/j.nuclphysa.2005.10.009 | J,NP/A,765,197,2006 | O1303 | 2GERGSI |   |   |   |
| Bertrand | 1973 | 10.1103/PhysRevC.8.1045 | J,PR/C,8,1045,1973 | C0925 | 1USAORL |   |   |   |
| Bertrand | 1974 | 10.1103/PhysRevC.10.1028 | J,PR/C,10,1028,1974 | C0814 | 1USAORL |   |   |   |
| Bhattacharya | 1991 | 10.1103/PhysRevC.44.1049 | J,PR/C,44,1049,1991 | D6166 | 3INDVEC |   |   |   |
| Bhattacharya | 1995 | 10.1103/PhysRevC.52.798 | J,PR/C,52,798,1995 | D6149 | 3INDTRM |   |   |   |
| Bhattacharya | 1996 | 10.1103/PhysRevC.54.3099 | J,PR/C,54,3099,1996 | D6153 | 3INDTAT |   |   |   |
| Billerey | 1981 | 10.1103/PhysRevLett.47.639 | J,PRL,47,639,1981 |   | 2FR GRE | B | Curve |   |
| Binns | 1987 | 10.1103/PhysRevC.36.1870 | J,PR/C,36,1870,1987 |   | 1USABRK | B | Table |   |
| Birnbaum | 1952 | 10.1103/PhysRev.86.86 | J,PR,86,86,1952 |   |   | N |   | Cosmic ray measurement |
| Bizard | 1977 | 10.1016/0375-9474(77)90645-5 | J,NP/A,285,461,1977 |   | 2FR SAT | B | Curve |   |
| Blank | 1994 | 10.1103/PhysRevC.50.2398 | J,PR/C,50,2398,1994 | O0736 | 2GERGSI |   |   |   |
| Bloch | 1988 | 10.1103/PhysRevC.37.2469 | J,PR/C,37,2469,1988 |   | 1USAMSU | B | Curve |   |
| Bobchenko | 1979 |   | J,SNP,30,805,1979 |   | 4RUSITE | B | Table | "inelastic" means non-elastic? |
| Bogatin | 1976 | 10.1016/0375-9474(76)90056-7 | J,NP/A,260,446,1976 | O0154 | 4ZZZDUB |   |   |   |
| Boger | 1994 | 10.1103/PhysRevC.49.1597 | J,PR/C,49,1597,1994 |   | 1USABRK | B | Curve |   |
| Bolshakova | 2009 | 10.1140/epjc/s10052-009-1053-8 | J,EPJ/C,62,293,2009 |   | 2ZZZCER | N | Table | Transverse momentum differential cross section |
| Bolshakova | 2009 | 10.1140/epjc/s10052-009-1092-1 | J,EPJ/C,62,697,2009 |   | 2ZZZCER | N | Table | Transverse momentum differential cross section |
| Bolshakova | 2009 | 10.1140/epjc/s10052-009-1114-z | J,EPJ/C,63,549,2009 |   | 2ZZZCER | N | Table | Transverse momentum differential cross section |
| Bolshakova | 2009 | 10.1140/epjc/s10052-009-1144-6 | J,EPJ/C,64,181,2009 |   | 2ZZZCER | N | Table | Transverse momentum differential cross section |
| Bolshakova | 2010 | 10.1140/epjc/s10052-010-1249-y | J,EPJ/C,66,57,2010 |   | 2ZZZCER | N | Table | Transverse momentum differential cross section |
| Brechtmann | 1986 | 10.1016/1359-0189(86)90609-6 |   |   | 1USABRK | B | Table | C.Brechtmann et al., Int. J. Radiat. Appl. Instrum., Part D, Nuclear Tracks 12 (1986) 361. |
| Brechtmann | 1988 | 10.1016/0168-583X(88)90475-2 | J,NIM/B,29,675,1988 | O1273 | 1USABRK |   |   | FACILITY: Add (LINAC,1USABRK). |
| Brechtmann | 1988 | 10.1007/BF01290126 | J,ZP/A,330,407,1988 |   | 2ZZZCER | B | Table |   |
| Brechtmann | 1988 | 10.1007/BF01291905 | J,ZP/A,331,463,1988 |   | 2ZZZCER+ | A | Table |   |
| Brechtmann | 1989 | 10.1103/PhysRevC.39.2222 | J,PR/C,39,2222,1989 |   | 1USABNL | B | Table |   |
| Britt | 1961 | 10.1103/PhysRev.124.877 | J,PR,124,877,1961 |   | 1USAYAL? | A | Curve |   |
| Brohm | 1995 | 10.1016/0375-9474(94)00507-J | J,NP/A,585,565,1995 |   | 2GERGSI | B | Table |   |
| Bubak | 2007 | 10.1103/PhysRevC.76.014618 | J,PR/C,76,014618,2007 | D0514 | 2GERJUL |   |   |   |
| Budzanowski | 2008 | 10.1103/PhysRevC.78.024603 | J,PR/C,78,024603,2008 | D0512 | 2GERJUL |   |   |   |
| Budzanowski | 2009 | 10.48550/arXiv.0909.1436 | X,ARXIV.0909.1436,2009 | C1763 | 2GERJUL |   |   | Published as J,PR/C,80,054604,2009. |
| Budzanowski | 2009 | 10.48550/arXiv.0910.1872 | X,ARXIV.0910.1872,2009 |   |   | N |   | No original measured data given |
| Budzanowski | 2010 | 10.1103/PhysRevC.82.034605 | J,PR/C,82,034605,2010 | O1865 | 2GERJUL |   |   |   |
| Caamaño | 2004 | 10.1016/j.nuclphysa.2004.01.070 | J,NP/A,733,187,2004 | A0672 | 2GERGSI |   |   |   |
| Caretto | 1958 | 10.1103/PhysRev.110.1130 | J,PR,110,1130,1958 | C0286 | 1USABNL+ |   |   | FACILITY: Must be (SYNCH,1USABNL) and (SYNCH,1USABRK). |
| Casarejos | 2006 | 10.1103/PhysRevC.74.044612 | J,PR/C,74,044612,2006 | O1441 | 2GERGSI |   |   |   |
| Caskey | 1988 | 10.1103/PhysRevC.37.969 | J,PR/C,37,969,1988 |   | 1USABRK | B | Curve |   |
| Charvet | 1987 | 10.1016/0370-2693(87)90646-0 | J,PL/B,189,388,1987 |   | 2FR GAN | N | Curve | Energy spectrum in arbitrary units |
| Chen | 1994 | 10.1103/PhysRevC.49.3200 | J,PR/C,49,3200,1994 |   | 1USABRK | B | Table |   |
| Cheshire | 1974 | 10.1103/PhysRevD.10.25 | J,PR/D,10,25,1974 |   | 1USABRK | B | Table |   |
| Chiba | 1991 | 10.1103/PhysRevLett.67.1982 | J,PRL,67,1982,1991 | E1460 | 2JPNLEP |   |   |   |
| Chrien | 1980 | 10.1103/PhysRevC.21.1014 | J,PR/C,21,1014,1980 | C0665 | 1USALAS |   |   |   |
| Christie | 1993 | 10.1103/PhysRevC.48.2973 | J,PR/C,48,2973,1993 |   | 1USABRK | B | Table |   |
| Chulkov | 2000 | 10.1016/S0375-9474(00)00168-8 | J,NP/A,674,330,2000 |   | 2GERGSI | B | Table |   |
| Clerc | 1995 | 10.1016/0375-9474(95)00215-M | J,NP/A,590,785,1995 | O0956 | 2GERGSI |   |   |   |
| Cline | 1971 | 10.1016/0375-9474(71)90897-9 | J,NP/A,169,437,1971 | B0085 | 1USASRE |   |   |   |
| Cocconi | 1961 | 10.1103/PhysRevLett.6.231 | J,PRL,6,231,1961 |   | 2ZZZCER | N | Curve | Momentum spectrum of CP without further specification |
| Cordell | 1981 | 10.1016/0375-9474(81)90425-5 | J,NP/A,352,485,1981 | T0061 | 1USASRL |   |   |   |
| Cowley | 1980 | 10.1103/PhysRevC.22.2633 | J,PR/C,22,2633,1980 | O0130 | 1USAMRY? |   |   |   |
| Cowley | 1998 | 10.1103/PhysRevC.57.3185 | J,PR/C,57,3185,1998 | E1707 | 2JPNOSA |   |   |   |
| Cowley | 2000 | 10.1103/PhysRevC.62.064604 | J,PR/C,62,064604,2000 | E1736 | 2JPNOSA |   |   |   |
| Crandall | 1956 | 10.1103/PhysRev.101.329 | J,PR,101,329,1956 | B0101 | 1USABRK |   |   |   |
| Cumming | 1958 | 10.1103/PhysRev.111.1386 | J,PR,111,1386,1958 | C0216 | 1USABNL |   |   |   |
| Cumming | 1962 | 10.1103/PhysRev.125.2078 | J,PR,125,2078,1962 | C0231 | 1USABNL |   |   |   |
| Cumming | 1962 | 10.1103/PhysRev.127.950 | J,PR,127,950,1962 | C0261 | 1USABNL |   |   |   |
| Cumming | 1963 | 10.1146/annurev.ns.13.120163.001401 | J,ARN,13,261,1963 | B0022 |   | N |   | Eval |
| Cumming | 1976 | 10.1103/PhysRevC.14.1554 | J,PR/C,14,1554,1976 | C1875 | 1USABRK |   |   |   |
| Cumming | 1978 | 10.1103/PhysRevC.17.1632 | J,PR/C,17,1632,1978 | C0238 | 1USABRK |   |   |   |
| Cummings | 1990 | 10.1103/PhysRevC.42.2508 | J,PR/C,42,2508,1990 | C1874 | 1USABRK |   |   |   |
| Currie | 1956 | 10.1103/PhysRev.101.1557 | J,PR,101,1557,1956 | C0836 | 1USABNL+ |   |   |   |
| Currie | 1959 | 10.1103/PhysRev.114.878 | J,PR,114,878,1959 | O0305 | 1USABRK |   |   |   |
| D'Auria | 1968 | 10.1103/PhysRev.168.1224 | J,PR,168,1224,1968 | C1432 | 1USAYAL |   |   |   |
| de Jong | 1998 | 10.1016/S0375-9474(97)00608-8 | J,NP/A,628,479,1998 | A0106 | 2GERGSI |   |   |   |
| De Lellis | 2011 | 10.1016/j.nuclphysa.2011.01.019 | J,NP/A,853,124,2011 |   | 2JPNIRS | A | Table |   |
| Deák | 1990 | 10.1103/PhysRevC.42.1029 | J,PR/C,42,1029,1990 |   | 1USAMSU | B | Curve |   |
| Dewins | 1969 | 10.1016/0375-9474(69)90465-5 | J,NP/A,126,261,1969 |   | 1USAUSC | A | Curve |   |
| Dey | 2009 | 10.1140/epja/i2009-10772-y | J,EPJ/A,41,39,2009 | D6078 | 3INDVEC |   |   |   |
| Dittrich | 1990 | 10.1016/0168-583X(90)90481-9 | J,NIM/B,52,588,1990 | O0281 | 2ZZZCER+ |   |   |   |
| Doering | 1978 | 10.1103/PhysRevLett.40.1433 | J,PRL,40,1433,1978 |   | 1USASRE | A | Curve |   |
| Dostrovsky | 1961 | 10.1103/PhysRev.123.1452 | J,PR,123,1452,1961 | C0294 | 1USABNL |   |   |   |
| Dostrovsky | 1965 | 10.1103/PhysRev.139.B1513 | J,PR,139,B1513,1965 | C0236 | 1USABNL |   |   |   |
| Dudkin | 1990 | 10.1016/0375-9474(90)90254-J | J,NP/A,509,783,1990 |   | 1USABRK | B | Table |   |
| Dufauquez | 2006 | 10.1016/j.nuclphysa.2006.04.005 | J,NP/A,773,24,2006 | O1417 | 2BLGLVN |   |   |   |
| Duisebayev | 2003 | 10.1103/PhysRevC.67.044608 | J,PR/C,67,044608,2003 | O1060 | 4KASKAZ |   |   |   |
| Duisebayev | 2005 | 10.1103/PhysRevC.72.054604 | J,PR/C,72,054604,2005 | O1307 | 4KASKAZ |   |   |   |
| Edge | 1969 | 10.1103/PhysRev.183.849 | J,PR,183,849,1969 | O0740 | 1USABNL |   |   |   |
| El Nadi | 1964 | 10.1016/0029-5582(64)90190-7 | J,NP,50,33,1964 |   |   | N |   | No original measured data given |
| Ellegaard | 1985 | 10.1016/0370-2693(85)90568-4 | J,PL/B,154,110,1985 |   | 2FR SAT | N | Curve | Delta resonance produciton cross section |
| El-Nadi | 2002 | 10.1088/0954-3899/28/6/308 | J,JP/G,28,1251,2002 |   | 1USABNL | B | Table |   |
| Engelage | 1986 | 10.1016/0370-2693(86)91225-6 | J,PL/B,173,34,1986 |   | 1USABRK | N | Curve | 3alpha system excitation energy spectrum |
| English | 1973 | 10.1103/PhysRevLett.31.244 | J,PRL,31,244,1973 |   | 1USANAL | B | Table |   |
| English | 1974 | 10.1103/PhysRevC.10.2268 | J,PR/C,10,2268,1974 | C2351 | 1USAANL |   |   |   |
| English | 1974 | 10.1103/PhysRevC.10.2281 | J,PR/C,10,2281,1974 | C2340 | 1USANAL |   |   |   |
| Enke | 1999 | 10.1016/S0375-9474(99)00345-0 | J,NP/A,657,317,1999 | O0678 | 2GERJUL |   |   |   |
| Enqvist | 1999 | 10.1016/S0375-9474(99)00299-7 | J,NP/A,658,47,1999 | A0099 | 2GERGSI |   |   |   |
| Enqvist | 2001 | 10.1016/S0375-9474(00)00563-7 | J,NP/A,686,481,2001 | O0833 | 2GERGSI |   |   |   |
| Enqvist | 2002 | 10.1016/S0375-9474(01)01340-9 | J,NP/A,703,435,2002 | O0921 | 2GERGSI |   |   |   |
| Erb | 1976 | 10.1103/PhysRevLett.37.670 | J,PRL,37,670,1976 |   | 1USAYAL? | A | Curve |   |
| Eyal | 1973 | 10.1103/PhysRevC.8.1109 | J,PR/C,8,1109,1973 | B0021 | 1USAYAL |   |   |   |
| Fernández-Domínguez | 2005 | 10.1016/j.nuclphysa.2004.10.013 | J,NP/A,747,227,2005 | O1228 | 2GERGSI |   |   |   |
| Fink | 1987 | 10.1016/0168-583X(87)90249-7 | J,NIM/B,29,275,1987 | O0104 | 2FR PAR+ |   |   |   |
| Fink | 1990 | 10.1016/0168-583X(90)90483-B | J,NIM/B,52,601,1990 | C0430 | 1USAHRV |   |   |   |
| Fink | 2000 | 10.1016/S0168-583X(00)00200-7 | J,NIM/B,172,861,2000 | O1233 | 1USAHRV |   |   |   |
| Fireman | 1955 | 10.1103/PhysRev.97.780 | J,PR,97,780,1955 | C1812 | 1USABNL |   |   |   |
| Flesch | 1999 | 10.1016/S1350-4487(99)00140-7 | J,RM,31,533,1999 | O0968 | 2GERGSI |   |   |   |
| Flesch | 2001 | 10.1016/S1350-4487(01)00158-5 | J,RM,34,237,2001 | O0971 | 2GERGSI |   |   |   |
| Fohr | 2011 | 10.1103/PhysRevC.84.054605 | J,PR/C,84,054605,2011 | A0908 | 2GERGSI |   |   |   |
| Fontes | 1971 | 10.1016/0375-9474(71)90769-X | J,NP/A,165,405,1971 | C0228 | 2FR PAR+ |   |   | Add (SYNCY,2FR PAR) and (SYNCY,2ZZZCER). |
| Fontes | 1977 | 10.1103/PhysRevC.15.2159 | J,PR/C,15,2159,1977 | B0092 | 2FR PAR+ |   |   |   |
| Fortney | 1980 | 10.1103/PhysRevC.21.2511 | J,PR/C,21,2511,1980 |   | 1USANAL+ | A | Curve |   |
| Fortney | 1980 | 10.1103/PhysRevC.22.670 | J,PR/C,22,670,1980 |   | 1USANAL | N | Curve | Energy and angular distribution in arbitrary units |
| Förtsch | 1988 | 10.1016/0375-9474(88)90101-7 | J,NP/A,485,258,1988 | O0534 | 3SAFNAC |   |   |   |
| Förtsch | 1991 | 10.1103/PhysRevC.43.691 | J,PR/C,43,691,1991 | O0173 | 3SAFNAC |   |   |   |
| Förtsch | 2007 | 10.1016/j.nuclphysa.2007.09.007 | J,NP/A,797,1,2007 | D0358 | 3SAFITH |   |   |   |
| Frankel | 1981 | 10.1103/PhysRevC.23.1511 | J,PR/C,23,1511,1981 |   | 1USABRK | B | Curve |   |
| Frascaria | 1975 | 10.1103/PhysRevC.12.243 | J,PR/C,12,243,1975 |   | 2FR PAR | A | Curve |   |
| Friedlander | 1954 | 10.1103/PhysRev.94.727 | J,PR,94,727,1954 | C0287 | 1USABRK |   |   |   |
| Friedlander | 1955 | 10.1103/PhysRev.99.263 | J,PR,99,263,1955 | C0264 | 1USABNL |   |   |   |
| Friese | 1993 | 10.1016/0375-9474(93)90693-R | J,NP/A,553,753,1993 |   | 2GERGSI | B | Table |   |
| Fukuda | 1984 | 10.1016/0375-9474(84)90023-X | J,NP/A,425,548,1984 | E1192 | 2JPNOSA |   |   |   |
| Fukuda | 1984 | 10.1016/0375-9474(84)90155-6 | J,NP/A,429,193,1984 | E1181 | 2JPNOSA |   |   |   |
| Fulmer | 1981 | 10.1016/0370-2693(81)90092-7 | J,PL/B,100,305,1981 |   | 1USAORL | B | Curve |   |
| Furukawa | 1971 | 10.1016/0375-9474(71)90401-5 | J,NP/A,174,539,1971 | O0972 | 2JPNTOK+ |   |   |   |
| Galin | 1974 | 10.1103/PhysRevC.9.1113 | J,PR/C,9,1113,1974 |   | 2FR PAR? | B | Curve |   |
| Galin | 1974 | 10.1103/PhysRevC.9.1126 | J,PR/C,9,1126,1974 |   | 2FR PAR? | B | Curve |   |
| Gazzaly | 1978 | 10.1016/0370-2693(78)90255-1 | J,PL/B,79,325,1978 |   | 1USABRK | N | Curve | Invariant cross section |
| Geaga | 1980 | 10.1103/PhysRevLett.45.1993 | J,PRL,45,1993,1980 |   | 1USABRK | N | Curve | Invariant cross section |
| Geer | 1995 | 10.1103/PhysRevC.52.334 | J,PR/C,52,334,1995 |   | 1USABNL | B | Table |   |
| Goldhaber | 1978 | 10.1146/annurev.ns.28.120178.001113 | J,ARN,28,161,1978 |   |   | N |   | Review |
| Golovchenko | 2001 | 10.1016/S1350-4487(01)00171-8 | J,RM,34,297,2001 |   | 2JPNIRS | A | Table |   |
| Golovchenko | 2002 | 10.1103/PhysRevC.66.014609 | J,PR/C,66,014609,2002 | O1044 | 2JPNIRS |   |   |   |
| Gonthier | 1980 | 10.1103/PhysRevLett.44.1387 | J,PRL,44,1387,1980 |   | 1USATAM | B | Curve |   |
| Gooding | 1960 | 10.1016/0029-5582(60)90384-9 | J,NP,18,46,1960 | C0227 | 2UK HAR |   |   | FACILITY: Add (SYNCY,2UK HAR). |
| Gooding | 1961 | 10.1103/PhysRevLett.7.28 | J,PRL,7,28,1961 |   | 1USABRK | A | Table |   |
| Gosset | 1977 | 10.1103/PhysRevC.16.629 | J,PR/C,16,629,1977 | C2151 | 1USABRK |   |   |   |
| Gradsztajn | 1965 | 10.1103/PhysRevLett.14.436 | J,PRL,14,436,1965 |   |   | N |   | No original measured data given |
| Graulich | 2000 | 10.1103/PhysRevC.63.011302 | J,PR/C,63,011302,2000 |   | 2BLGLVN | N | Curve | Energy spectrum in arbitrary units |
| Green | 1980 | 10.1103/PhysRevC.22.1594 | J,PR/C,22,1594,1980 | C0654 | 1CANTMF |   |   |   |
| Green | 1987 | 10.1103/PhysRevC.35.1341 | J,PR/C,35,1341,1987 | C0763 | 1CANTMF |   |   |   |
| Greiner | 1975 | 10.1103/PhysRevLett.35.152 | J,PRL,35,152,1975 |   | 1USABRK | N | Curve | Paralel-momentum distribution |
| Griffiths | 1969 | 10.1086/150231 | J,AJ,158,711,1969 |   | 2UK NIN | A | Curve |   |
| Guertin | 2005 | 10.1140/epja/i2004-10073-1 | J,EPJ/A,23,49,2005 | O1146 | 2BLGLVN |   |   |   |
| Gupta | 1999 | 10.1016/S0375-9474(98)00635-6 | J,NP/A,646,161,1999 | D0441 | 3INDTRM |   |   |   |
| Gutbrod | 1976 | 10.1103/PhysRevLett.37.667 | J,PRL,37,667,1976 |   | 1USABRK | B | Curve |   |
| Harada | 1999 | 10.1080/18811248.1999.9726214 | J,NST,36,313,1999 | E1761 | 2JPNKYU+ |   |   |   |
| Hautala | 2002 | 10.1103/PhysRevC.65.034612 | J,PR/C,65,034612,2002 | C0864 | 1USAINU |   |   |   |
| He | 1994 | 10.1007/BF01289597 | J,ZP/A,348,105,1994 |   | 1USABNL | B | Table |   |
| Heckman | 1972 | 10.1103/PhysRevLett.28.926 | J,PRL,28,926,1972 |   | 1USABRK | B | Table |   |
| Heckman | 1978 | 10.1103/PhysRevC.17.1735 | J,PR/C,17,1735,1978 |   | 1USABRK | N | Table | Not clear if "Experiment" in Table III is for compilation |
| Heilbronn | 1991 | 10.1103/PhysRevC.43.2318 | J,PR/C,43,2318,1991 |   | 1USAMSU | B | Curve |   |
| Henzlova | 2008 | 10.1103/PhysRevC.78.044616 | J,PR/C,78,044616,2008 |   | 2GERGSI | B | Table |   |
| Herbach | 2006 | 10.1016/j.nuclphysa.2005.10.014 | J,NP/A,765,426,2006 | O1305 | 2GERGSI |   |   |   |
| Heydegger | 1976 | 10.1103/PhysRevC.14.1506 | J,PR/C,14,1506,1976 | O0501 | 1USACHI+ |   |   |   |
| Hicks | 1956 | 10.1103/PhysRev.102.1390 | J,PR,102,1390,1956 | C0257 | 1USABRK |   |   |   |
| Hintz | 1952 | 10.1103/PhysRev.88.19 | J,PR,88,19,1952 | B0076 | 1USAHRV |   |   |   |
| Hirzebruch | 1992 | 10.1103/PhysRevC.46.1487 | J,PR/C,46,1487,1992 |   | 4ZZZDUB+ | B | Table |   |
| Hirzebruch | 1995 | 10.1103/PhysRevC.51.2085 | J,PR/C,51,2085,1995 |   | 1USABNL | B | Table |   |
| Honda | 1960 | 10.1103/PhysRev.118.1618 | J,PR,118,1618,1960 | C0235 | 1USABRK |   |   |   |
| Honda | 1964 | 10.1016/0029-5582(64)90277-9 | J,NP,51,363,1964 | C0226 | 1USABRK |   |   |   |
| Horváth | 1994 | 10.1103/PhysRevC.49.1012 | J,PR/C,49,1012,1994 |   | 1USAMSU | B | Curve |   |
| Horwitz | 1960 | 10.1103/PhysRev.117.1361 | J,PR,117,1361,1960 | C0221 | 1USABRK |   |   |   |
| Hsi | 1999 | 10.1103/PhysRevC.60.034609 | J,PR/C,60,034609,1999 |   | 1USABNL | N | Curve | Angular distribution in arbitrary units |
| Hudis | 1968 | 10.1103/PhysRev.171.1297 | J,PR,171,1297,1968 | C0341 | 1USABNL |   |   |   |
| Hudis | 1968 | 10.1103/PhysRev.171.1301 | J,PR,171,1301,1968 | B0078 | 1USABNL |   |   |   |
| Hudis | 1970 | 10.1103/PhysRevC.1.2019 | J,PR/C,1,2019,1970 | C0340 | 1USABNL |   |   |   |
| Husain | 1973 | 10.1103/PhysRevC.7.2452 | J,PR/C,7,2452,1973 | C2366 | 1USABNL |   |   |   |
| Hyde | 1971 | 10.1103/PhysRevC.4.1759 | J,PR/C,4,1759,1971 | C0393 | 1USABRK |   |   |   |
| Iancu | 2005 | 10.1016/j.radmeas.2004.10.011 | J,RM,39,525,2005 | O1271 | 2GERGSI |   |   |   |
| Ieiri | 1989 | 10.1016/0375-9474(89)90554-X | J,NP/A,504,477,1989 | E1315 | 2JPNOSA |   |   |   |
| Inamura | 1979 | 10.1016/0370-2693(79)90651-8 | J,PL/B,84,71,1979 | E0144 | 2JPNIPC |   |   |   |
| Iwamoto | 2010 | 10.1103/PhysRevC.82.034604 | J,PR/C,82,034604,2010 | E2289 | 2JPNOSA |   |   |   |
| Jacak | 1983 | 10.1103/PhysRevLett.51.1846 | J,PRL,51,1846,1983 |   | 1USABRK | B | Curve |   |
| Jäderström | 2008 | 10.1103/PhysRevC.77.044601 | J,PR/C,77,044601,2008 | O1658 | 2SWDUPP |   |   |   |
| Jaros | 1978 | 10.1103/PhysRevC.18.2273 | J,PR/C,18,2273,1978 | O0744 | 1USABRK |   |   |   |
| Jilany | 2004 | 10.1103/PhysRevC.70.014901 | J,PR/C,70,014901,2004 |   | 4ZZZDUB | N | Table | Particle multiplicities |
| Junghans | 1998 | 10.1016/S0375-9474(98)00658-7 | J,NP/A,629,635,1998 | A0113 | 2GERGSI |   |   |   |
| Kadkin | 1998 |   | J,PAN,61,1459,1998 | D5001 | 4UKRIJD |   |   |   |
| Karnaukhov | 2003 | 10.1103/PhysRevC.67.011601 | J,PR/C,67,011601,2003 |   |   | N |   | No original measured data given |
| Katcoff | 1959 | 10.1103/PhysRev.114.905 | J,PR,114,905,1959 | C0242 | 1USABNL |   |   | FACILITY: Must be (SYNCH,1USABNL). |
| Katcoff | 1968 | 10.1103/PhysRev.166.1147 | J,PR,166,1147,1968 | C0339 | 1USABNL |   |   |   |
| Kaufman | 1980 | 10.1103/PhysRevC.22.167 | J,PR/C,22,167,1980 | C0480 | 1USABNL+ |   |   |   |
| Kavaloski | 1963 | 10.1103/PhysRev.132.813 | J,PR,132,813,1963 |   | 1USAMIN | A | Curve |   |
| Kiang | 1989 | 10.1016/0375-9474(89)90050-X | J,NP/A,499,339,1989 | E1325 | 2JPNTOH |   |   |   |
| Kidd | 1988 | 10.1103/PhysRevC.37.2613 | J,PR/C,37,2613,1988 |   | 1USABRK | A | Table |   |
| Kim | 2002 | 10.1016/S0168-583X(02)01297-1 | J,NIM/B,196,239,2002 | C0941 | 1USADAV+ |   |   |   |
| Kin | 2005 | 10.1103/PhysRevC.72.014606 | J,PR/C,72,014606,2005 | E1936 | 2JPNOSA |   |   |   |
| Knott | 1996 | 10.1103/PhysRevC.53.347 | J,PR/C,53,347,1996 | C1230 | 1USABRK |   |   |   |
| Knott | 1997 | 10.1103/PhysRevC.56.398 | J,PR/C,56,398,1997 | C1231 | 1USABRK |   |   |   |
| Kobayashi | 1988 | 10.1103/PhysRevLett.60.2599 | J,PRL,60,2599,1988 | E1256 | 1USABRK |   |   |   |
| Korejwo | 2000 | 10.1088/0954-3899/26/8/306 | J,JP/G,26,1171,2000 | A0661 | 4ZZZDUB |   |   |   |
| Korejwo | 2002 | 10.1088/0954-3899/28/6/304 | J,JP/G,28,1199,2002 | A0660 | 4ZZZDUB |   |   |   |
| Korteling | 1970 | 10.1103/PhysRevC.1.193 | J,PR/C,1,193,1970 | C0252 | 1USACAR |   |   |   |
| Korteling | 1970 | 10.1103/PhysRevC.1.1960 | J,PR/C,1,1960,1970 | C0253 | 1USACAR |   |   |   |
| Kox | 1987 | 10.1103/PhysRevC.35.1678 | J,PR/C,35,1678,1987 |   | 2FR SAT+ | A | Table |   |
| Kreutz | 1993 | 10.1016/0375-9474(93)90476-E | J,NP/A,556,672,1993 |   | 2GERGSI | N | Curve | Charge cross section gated by Zbound |
| Kundu | 2008 | 10.1103/PhysRevC.78.044601 | J,PR/C,78,044601,2008 | D6066 | 3INDVEC |   |   |   |
| Kwiatkowski | 1986 | 10.1016/0370-2693(86)90994-9 | J,PL/B,171,41,1986 |   | 1USAINU | A | Curve |   |
| Kyun Kim | 1994 | 10.1016/0375-9474(94)90764-1 | J,NP/A,578,621,1994 | E2019 | 2JPNIPC |   |   |   |
| La Tessa | 2007 | 10.1016/j.nuclphysa.2007.04.016 | J,NP/A,791,434,2007 | E2056 | 2JPNIRS |   |   |   |
| Lafleur | 1966 | 10.1139/v66-410 | J,CJC,44,2749,1966 | C0401 | 1CANMCG |   |   |   |
| Leistenschneider | 2002 | 10.1103/PhysRevC.65.064607 | J,PR/C,65,064607,2002 | A0407 | 2GERGSI |   |   |   |
| Lemaire | 1979 | 10.1016/0370-2693(79)90772-X | J,PL/B,85,38,1979 |   | 1USABRK | N | Curve | Invariant cross section |
| Lestringuez | 1971 | 10.1016/0370-2693(71)90717-9 | J,PL/B,36,331,1971 | O2053 | 1USABRK |   |   |   |
| Letourneau | 2002 | 10.1016/S0375-9474(02)01133-8 | J,NP/A,712,133,2002 | D0579 | 2GERJUL |   |   |   |
| Lewandowski | 1980 | 10.1007/BF02776069 | J,NCL,28,15,1980 | O0754 | 2SWTVIL |   |   |   |
| Leya | 1998 | 10.1016/S0168-583X(98)00528-X | J,NIM/B,145,449,1998 | O0520 | 2SWTPSI+ |   |   |   |
| Leya | 2005 | 10.1016/j.nimb.2004.11.009 | J,NIM/B,229,1,2005 | O0839 | 2FR SAT+ |   |   |   |
| Liang | 1997 | 10.1103/PhysRevC.56.908 | J,PR/C,56,908,1997 | C1455 | 1USAWAU |   |   |   |
| Lindner | 1956 | 10.1103/PhysRev.103.378 | J,PR,103,378,1956 | C0367 | 1USABRK |   |   |   |
| Lindsay | 1962 | 10.1103/PhysRev.127.1269 | J,PR,127,1269,1962 | C1508 | 1USAUSC |   |   |   |
| Lindstrom | 1975 |   | R,LBL-3650,1975 |   | 1USABRK | B | Table |   |
| Logan | 1980 | 10.1103/PhysRevC.22.104 | J,PR/C,22,104,1980 |   | 1USABRK | B | Curve |   |
| Logan | 1980 | 10.1103/PhysRevC.22.1080 | J,PR/C,22,1080,1980 | C0358 | 1USABRK |   |   |   |
| Loveland | 1977 | 10.1016/0370-2693(77)90546-9 | J,PL/B,69,284,1977 | C2535 | 1USABRK |   |   |   |
| Loveland | 1977 | 10.1103/PhysRevLett.39.320 | J,PRL,39,320,1977 | C2536 | 1USABRK |   |   |   |
| Lukyanov | 2009 | 10.1103/PhysRevC.80.014609 | J,PR/C,80,014609,2009 | C1723 | 1USAMSU |   |   |   |
| Machner | 1984 | 10.1016/0370-2693(84)91868-9 | J,PL/B,138,39,1984 | O0524 | 2FR PAR |   |   |   |
| Marcinkowski | 1998 | 10.1016/S0375-9474(98)00128-6 | J,NP/A,633,446,1998 | O0503 | 3POLIPJ |   |   |   |
| Marquez | 1951 | 10.1103/PhysRev.81.953 | J,PR,81,953,1951 | C0259 | 1USABRK |   |   | INSTITUTE: 1USALRL -> 1USABRK |
| Marquez | 1952 | 10.1103/PhysRev.86.405 | J,PR,86,405,1952 | C0250 | 1USACHI |   |   |   |
| Matsuoka | 1983 | 10.1016/0375-9474(83)90351-2 | J,NP/A,408,99,1983 | E0816 | 2JPNOSA |   |   |   |
| McGill | 1984 | 10.1103/PhysRevC.29.204 | J,PR/C,29,204,1984 | T0156 | 1USALAS |   |   |   |
| Meadows | 1951 | 10.1103/PhysRev.83.1257 | J,PR,83,1257(1),1951 | C0266 | 1USAHRV |   |   |   |
| Merchel | 2000 | 10.1016/S0168-583X(00)00105-1 | J,NIM/B,172,806,2000 | O1229 | 2FR SAT+ |   |   |   |
| Meyer | 1972 |   | J,AAA/S,7,417,1972 |   |   | N |   | Compilation |
| Meyer | 1980 | 10.1103/PhysRevC.22.179 | J,PR/C,22,179,1980 |   | 1USABRK | A | Curve |   |
| Michel | 1979 | 10.1016/0375-9474(79)90332-4 | J,NP/A,322,40,1979 | A0146 | 2GERJUL |   |   |   |
| Michel | 1985 | 10.1016/0375-9474(85)90441-5 | J,NP/A,441,617,1985 | A0100 | 2FR PAR+ |   |   |   |
| Michel | 1995 | 10.1016/0168-583X(95)00566-8 | J,NIM/B,103,183,1995 | O0277 | 2FR SAT+ |   |   |   |
| Michel | 1996 | 10.1016/0168-583X(95)01345-8 | J,NIM/B,113,434,1996 |   |   | N |   | Conf. proc. Review of their activity. |
| Michel | 1997 | 10.1016/S0168-583X(97)00213-9 | J,NIM/B,129,153,1997 | O0276 | 2SWDUPP+ |   |   |   |
| Mills | 1992 | 10.1016/0883-2889(92)90221-Y | J,ARI,43,1019,1992 | A0507 | 3SAFNAC |   |   |   |
| Miura | 1987 | 10.1016/0375-9474(87)90329-0 | J,NP/A,467,79,1987 | E1371 | 2JPNTOH |   |   |   |
| Mocko | 2006 | 10.1103/PhysRevC.74.054612 | J,PR/C,74,054612,2006 |   | 1USAMSU | B | Curve |   |
| Mocko | 2007 | 10.1103/PhysRevC.76.014609 | J,PR/C,76,014609,2007 | E2059 | 2JPNIPC |   |   |   |
| Momota | 2002 | 10.1016/S0375-9474(01)01564-0 | J,NP/A,701,150,2002 | A0455 | 2JPNIPC+ |   |   |   |
| Morita | 1982 | 10.1103/PhysRevC.26.511 | J,PR/C,26,511,1982 | C2568 | 1USABRK |   |   |   |
| Motobayashi | 1984 | 10.1016/0375-9474(84)90376-2 | J,NP/A,413,290,1984 | E0828 | 2JPNOSA |   |   |   |
| Mougey | 1981 | 10.1016/0370-2693(81)90032-0 | J,PL/B,105,25,1981 |   | 2ZZZCER | A | Table |   |
| Murakami | 2003 |   | C,2003VARENN,,541,2003 |   | 2JPNIRS | B | Curve |   |
| Murphy | 1983 | 10.1103/PhysRevC.28.428 | J,PR/C,28,428,1983 |   | 1USABRK? | N | Curve | Energy spectrum in arbitrary units |
| Mustapha | 1999 |   | C,99BORMIO,,1999 | O0784 | 2GERGSI |   |   | Published as J,NP/A,683,540,2001. See also R,IPNO-T-99-05,1999. |
| Nagamiya | 1979 | 10.1016/0370-2693(79)90509-4 | J,PL/B,81,147,1979 |   | 1USABRK | N | Curve | Invariant cross section |
| Nagamiya | 1980 | 10.1103/PhysRevLett.45.602 | J,PRL,45,602,1980 |   | 1USABRK? | N | Curve | Invariant cross section |
| Nagamiya | 1981 | 10.1103/PhysRevC.24.971 | J,PR/C,24,971,1981 |   | 1USABRK | B | Curve | Only Fig.16, Table IV and Fig.26 for EXFOR? |
| Nakamura | 2007 | 10.1142/5973  | B,NAKAMURA,2007 |   |   | N |   | Compilation |
| Nakayama | 2007 | 10.1103/PhysRevC.76.021305 | J,PR/C,76,021305,2007 | E2037 | 2JPNOSA |   |   |   |
| Napolitani | 2004 | 10.1103/PhysRevC.70.054607 | J,PR/C,70,054607,2004 | O1176 | 2GERGSI |   |   |   |
| Napolitani | 2007 | 10.1103/PhysRevC.76.064609 | J,PR/C,76,064609,2007 | O1589 | 2GERGSI |   |   |   |
| Natowitz | 1981 | 10.1103/PhysRevLett.47.1114 | J,PRL,47,1114,1981 |   | 1USABRK | N | Curve | Energy spectrum in arbitrary units |
| Newton | 1962 | 10.1088/0370-1328/79/1/305 | J,PPS,79,27,1962 |   | 2UK HAR | A | Table |   |
| Nicholls | 1972 | 10.1016/0375-9474(72)90925-6 | J,NP/A,181,329,1972 | O0531 | 2UK HAR |   |   |   |
| Nilsen | 1995 | 10.1103/PhysRevC.52.3277 | J,PR/C,52,3277,1995 |   | 1USABRK | A | Curve |   |
| Notani | 2007 | 10.1103/PhysRevC.76.044605 | J,PR/C,76,044605,2007 | E2085 | 2JPNIPC |   |   |   |
| Ogilvie | 1991 | 10.1103/PhysRevLett.67.1214 | J,PRL,67,1214,1991 |   | 2GERGSI | B | Curve |   |
| Ohnuma | 1986 | 10.1016/0375-9474(86)90366-0 | J,NP/A,456,61,1986 | E1695 | 2JPNTOK+ |   |   |   |
| Ohnuma | 1987 | 10.1016/0375-9474(87)90328-9 | J,NP/A,467,61,1987 | E1372 | 2JPNTOH |   |   | FACILITY: Add (ISOCY,2JPNTOH). |
| Okihana | 1997 | 10.1016/S0375-9474(96)00452-6 | J,NP/A,614,71,1997 | E1678 | 2JPNOSA |   |   |   |
| Okumuşoǧlu | 1974 | 10.1016/0375-9474(74)90503-X | J,NP/A,231,391,1974 | D0346 | 2UK BIR |   |   | FACILITY: Add 2UK BIR in the 2nd field. |
| Olson | 1981 | 10.1103/PhysRevC.24.1529 | J,PR/C,24,1529,1981 |   | 1USABRK | B | Table |   |
| Olson | 1983 | 10.1103/PhysRevC.28.1602 | J,PR/C,28,1602,1983 |   |   | N |   | Theoretical analysis of tabulated cross sections from Refs.1 and 2? |
| Ozawa | 2000 | 10.1016/S0375-9474(00)00147-0 | J,NP/A,673,411,2000 |   | 2GERGSI | B | Table |   |
| Pakou | 2003 | 10.1103/PhysRevLett.90.202701 | J,PRL,90,202701,2003 | A0690 | 2GRCATH |   |   |   |
| Pakou | 2005 | 10.1103/PhysRevC.71.064602 | J,PR/C,71,064602,2005 | D0355 | 2GRCATH |   |   |   |
| Parikh | 1960 | 10.1016/0029-5582(60)90430-2 | J,NP,18,628,1960 | C0206 | 2UK LVP |   |   |   |
| Parikh | 1960 | 10.1016/0029-5582(60)90431-4 | J,NP,18,638,1960 | C0207 | 2UK LVP |   |   |   |
| Pate | 1961 | 10.1103/PhysRev.123.647 | J,PR,123,647,1961 | C0369 | 1USABNL+ |   |   | FACILITY: (SYNCY,1USALRL) -> (SYNCH,1USABRK) |
| Perdrisat | 1969 | 10.1103/PhysRev.187.1201 | J,PR,187,1201,1969 |   | 1USASRE | A | Table |   |
| Pereira | 2007 | 10.1103/PhysRevC.75.014602 | J,PR/C,75,014602,2007 | O1504 | 2GERGSI |   |   |   |
| Perron | 1976 | 10.1103/PhysRevC.14.1108 | J,PR/C,14,1108,1976 | O0085 | 2ZZZCER |   |   |   |
| Pfaff | 1995 | 10.1103/PhysRevC.51.1348 | J,PR/C,51,1348,1995 |   | 1USAMSU | B | Curve |   |
| Pfaff | 1996 | 10.1103/PhysRevC.53.1753 | J,PR/C,53,1753,1996 |   | 1USAMSU | B | Curve |   |
| Pfeiffer | 1973 | 10.1016/0375-9474(73)90084-5 | J,NP/A,206,545,1973 |   | 2GERMPH? | A | Curve |   |
| Pfützner | 1995 | 10.1016/0375-9474(94)00816-6 | J,NP/A,587,229,1995 | O0944 | 2GERGSI |   |   |   |
| Poppe | 1963 | 10.1103/PhysRev.129.733 | J,PR,129,733,1963 | A1090 | 1USAWIS? |   |   |   |
| Porile | 1964 | 10.1103/PhysRev.135.B122 | J,PR,135,B122,1964 | C0270 | 1USABNL |   |   |   |
| Porile | 1989 | 10.1103/PhysRevC.39.1914 | J,PR/C,39,1914,1989 |   | 1USABNL | B | Table |   |
| Poskanzer | 1971 | 10.1103/PhysRevC.3.882 | J,PR/C,3,882,1971 | C0376 | 1USABRK |   |   |   |
| Poskanzer | 1975 | 10.1103/PhysRevLett.35.1701 | J,PRL,35,1701,1975 |   | 1USABRK | B | Curve |   |
| Price | 1991 | 10.1103/PhysRevC.43.835 | J,PR/C,43,835,1991 |   | 1USABNL | B | Table |   |
| Prout | 2002 | 10.1103/PhysRevC.65.034611 | J,PR/C,65,034611,2002 | C0863 | 1USAINU |   |   |   |
| Pugh | 1973 | 10.1016/0370-2693(73)90681-3 | J,PL/B,46,192,1973 |   | 1USAMRY | N | Curve | dσ/dΩ1/dΩ2/dE1 without angle values |
| Radin | 1974 | 10.1103/PhysRevC.9.1718 | J,PR/C,9,1718,1974 | C2346 | 1USABRK |   |   |   |
| Raisbeck | 1972 | 10.1103/PhysRevC.6.685 | J,PR/C,6,685,1972 | C0233 | 2FR PAR+ |   |   | FACILITY: Add (SYNCY,2FR PAR), (SYNCY,2ZZZCER) and (SYNCY,1USABRK). |
| Raisbeck | 1974 | 10.1103/PhysRevC.9.1385 | J,PR/C,9,1385,1974 | O2056 | 2FR PAR+ |   |   |   |
| Raisbeck | 1975 | 10.1103/PhysRevC.12.915 | J,PR/C,12,915,1975 | O0094 | 2FR SAC+ |   |   |   |
| Raisbeck | 1975 | 10.1103/PhysRevLett.35.155 | J,PRL,35,155,1975 | O2242 | 2FR SAT |   |   | FACILITY: 2FR CSN -> 2FR SAT |
| Ramaty | 1969 | 10.1086/149894 | J,AJ,155,587,1969 |   |   | N |   |   |
| Rayudu | 1964 | 10.1139/v64-178 | J,CJC,42,1149,1964 | O0073 | 1USACAR |   |   |   |
| Reeder | 1965 | 10.1016/0022-1902(65)80038-0 | J,JIN,27,1879,1965 | O0583 | 1USABNL |   |   |   |
| Reedy | 1987 | 10.1016/0168-583X(87)90245-X | J,NIM/B,29,251,1987 |   |   | N |   | No original measured data given |
| Reedy | 2007 |   | C,2007LEAGUE,,1192,2007 |   |   | N |   | Compilation |
| Regnier | 1979 | 10.1103/PhysRevC.20.1517 | J,PR/C,20,1517,1979 | O0095 | 2FR GRA+ |   |   |   |
| Reinhold | 1998 | 10.1103/PhysRevC.58.247 | J,PR/C,58,247,1998 | O1015 | 2GERGSI |   |   |   |
| Reisdorf | 2010 | 10.1016/j.nuclphysa.2010.09.008 | J,NP/A,848,366,2010 |   | 2GERGSI | N | Curve | Rapidity distribution |
| Rejmund | 2001 | 10.1016/S0375-9474(00)00468-1 | J,NP/A,683,540,2001 | O0784 | 2GERGSI |   |   |   |
| Remington | 1986 | 10.1103/PhysRevC.34.1685 | J,PR/C,34,1685,1986 |   | 1USAMSU | B | Curve | Fig.10 only |
| Remsberg | 1963 | 10.1103/PhysRev.130.2069 | J,PR,130,2069,1963 | C0269 | 1USACOL |   |   |   |
| Remsberg | 1975 | 10.1103/PhysRevLett.35.361 | J,PRL,35,361,1975 |   | 1USABNL | B | Curve |   |
| Renberg | 1972 | 10.1016/0375-9474(72)90932-3 | J,NP/A,183,81,1972 | O0213 | 2ZZZCER |   |   |   |
| Ricciardi | 2006 | 10.1103/PhysRevC.73.014607 | J,PR/C,73,014607,2006 | O1302 | 2GERGSI |   |   |   |
| Richter | 1992 | 10.1103/PhysRevC.46.1030 | J,PR/C,46,1030,1992 | O0535 | 3SAFNAC |   |   |   |
| Ridikas | 2000 | 10.1103/PhysRevC.63.014610 | J,PR/C,63,014610,2000 | D0489 | 3SAFITH |   |   |   |
| Roeder | 2006 | 10.1103/PhysRevC.74.034602 | J,PR/C,74,034602,2006 | C1465 | 1USAMSU |   |   |   |
| Rosenfeld | 1956 | 10.1103/PhysRev.103.413 | J,PR,103,413,1956 | C0060 | 1USACHI |   |   |   |
| Rowland | 1958 | 10.1103/PhysRev.110.175 | J,PR,110,175,1958 | C0243 | 1USABNL |   |   | FACILITY: Must be (SYNCH,1USABNL). |
| Roy | 1981 | 10.1103/PhysRevC.23.1671 | J,PR/C,23,1671,1981 | O0146 | 1CANTMF |   |   |   |
| Rudy | 1975 | 10.1016/0370-2693(75)90036-2 | J,PL/B,59,240,1975 |   | 1USABRK | N | Table | Cross section ratio of 12C(25.2 GeV)/p(300 GeV) |
| Samanta | 1992 | 10.1103/PhysRevC.45.1757 | J,PR/C,45,1757,1992 | O1173 | 3INDVEC |   |   |   |
| Sampsonidis | 1995 | 10.1103/PhysRevC.51.3304 | J,PR/C,51,3304,1995 |   | 4ZZZDUB | B | Curve |   |
| Sandoval | 1980 | 10.1103/PhysRevC.21.1321 | J,PR/C,21,1321,1980 |   | 1USABRK | B | Table | Numerical data available as PAPS PRVCA 21-1321-118. |
| Scampoli | 2005 | 10.1016/j.asr.2005.01.046 | J,ASR,35,230,2005 |   | 1USABNL | A | Table |   |
| Schaeffer | 1959 | 10.1103/PhysRev.113.674 | J,PR,113,674,1959 | C0277 | 1USABNL+ |   |   |   |
| Schall | 1996 | 10.1016/0168-583X(96)00325-4 | J,NIM/B,117,221,1996 |   | 2GERGSI | A | Table |   |
| Schiekel | 1996 | 10.1016/0168-583X(95)01396-2 | J,NIM/B,113,484,1996 | O0353 | 2FR SAT+ |   |   | FACILITY: |
| Schiekel | 1996 | 10.1016/0168-583X(96)00145-0 | J,NIM/B,114,91,1996 | O0284 | 2FR SAT |   |   | FACILITY: 2FR SAC -> 2FR SAT |
| Schnabel | 2004 | 10.1016/j.nimb.2004.04.150 | J,NIM/B,223-224,812,2004 | O1741 | 2SWDUPP+ |   |   |   |
| Schweizer | 1979 | 10.1103/PhysRevC.19.1408 | J,PR/C,19,1408,1979 |   | 1USASRE | A | Curve |   |
| Segel | 1982 | 10.1103/PhysRevC.26.2424 | J,PR/C,26,2424,1982 | O0149 | 1USAINU |   |   |   |
| Sengupta | 1989 | 10.1016/0370-2693(89)91270-7 | J,PL/B,222,301,1989 |   | 2ZZZCER | B | Table |   |
| Shibata | 1985 | 10.1016/0375-9474(85)90155-1 | J,NP/A,441,445,1985 | E1223 | 2JPNOSA |   |   |   |
| Shyam | 1999 | 10.1007/s12043-999-0036-5 | J,PRM,53,595,1999 |   |   | N |   | No origial measured data given |
| Signorini | 2003 | 10.1103/PhysRevC.67.044607 | J,PR/C,67,044607,2003 | O1320 | 2ITYPAD |   |   |   |
| Simpson | 1983 | 10.1146/annurev.ns.33.120183.001543 | J,ARN,33,323,1983 |   |   | N |   | Review |
| Singh | 1990 | 10.1103/PhysRevC.42.1757 | J,PR/C,42,1757,1990 |   | 2ZZZCER | N | Table | Mean free path |
| Singh | 1991 | 10.1103/PhysRevC.43.2417 | J,PR/C,43,2417,1991 |   | 1USABRK | B | Table |   |
| Singh | 1994 | 10.1016/0375-9474(94)90085-X | J,NP/A,570,819,1994 |   | 4ZZZDUB | B | Table | Cross section for an emulsion target |
| Singh | 1996 | 10.1103/PhysRevC.54.3185 | J,PR/C,54,3185,1996 |   | 2ZZZCER | N | Curve | Multiplicity distribution |
| Singh | 2010 | 10.1007/s12648-010-0117-9 | J,IJP,84,1257,2010 |   | 2GERGSI | B | Table |   |
| Singh | 2011 | 10.1007/s12648-011-0170-z | J,IJP,85,1523,2011 |   | 2GERGSI | N | Table | Transverse momentum differential cross section |
| Sisterson | 1997 | 10.1016/S0168-583X(96)00409-0 | J,NIM/B,123,324,1997 | C0507 | 1USADAV+ |   |   |   |
| Siwek-Wilczyńska | 1979 | 10.1103/PhysRevLett.42.1599 | J,PRL,42,1599,1979 |   | 2NEDKVI | A | Curve |   |
| Skoski | 1973 | 10.1103/PhysRevLett.30.51 | J,PRL,30,51,1973 |   | 1USAPTN | A | Table |   |
| Sobotka | 1983 | 10.1103/PhysRevLett.51.2187 | J,PRL,51,2187,1983 |   | 1USABRK | A | Curve |   |
| Souliotis | 1994 | 10.1103/PhysRevC.49.3301 | J,PR/C,49,3301,1994 |   | 1USAMSU | B | Curve |   |
| Sourkes | 1976 | 10.1103/PhysRevC.13.451 | J,PR/C,13,451,1976 | A1261 | 1USAMIN |   |   |   |
| Souza | 2009 | 10.1016/j.nuclphysa.2009.02.009 | J,NP/A,821,36,2009 | D0564 | 3BZLUSP |   |   |   |
| Stapleton | 1971 | 10.1016/0375-9474(71)90625-7 | J,NP/A,175,124,1971 | C0248 | ? |   |   |   |
| Steckmeyer | 1989 | 10.1016/0375-9474(89)90430-2 | J,NP/A,500,372,1989 |   | 2FR GAN | B | Curve |   |
| Stéphan | 1991 | 10.1016/0370-2693(91)90634-3 | J,PL/B,262,6,1991 |   | 2FR GAN | B | Table |   |
| Stevenson | 1981 | 10.1103/PhysRevC.24.2102 | J,PR/C,24,2102,1981 |   | 1USABRK | A | Curve |   |
| Stock | 1980 | 10.1103/PhysRevLett.44.1243 | J,PRL,44,1243,1980 |   | 1USABRK | N | Curve | Gated by "high multiplicity" and "low multiplicity" |
| Stolz | 2002 | 10.1103/PhysRevC.65.064603 | J,PR/C,65,064603,2002 | A0369 | 2GERGSI |   |   |   |
| Stovall | 1964 | 10.1103/PhysRev.135.B330 | J,PR,135,B330,1964 | O0166 | 1USAMIN |   |   |   |
| Strauch | 1956 | 10.1103/PhysRev.104.191 | J,PR,104,191,1956 | O0227 | 1USAHRV |   |   |   |
| Streibel | 1997 | 10.1016/S1350-4487(97)00091-7 | J,RM,28,317,1997 |   | 1USABNL+ | N |   | Production cross section relative to C and Al production |
| Sugitate | 1982 | 10.1016/0375-9474(82)90422-5 | J,NP/A,388,402,1982 | E0842 | 2JPNIPC |   |   |   |
| Symons | 1979 | 10.1103/PhysRevLett.42.40 | J,PRL,42,40,1979 |   | 1USABRK | A | Table |   |
| Taieb | 2003 | 10.1016/S0375-9474(03)01517-3 | J,NP/A,724,413,2003 | O1053 | 2GERGSI |   |   |   |
| Tanaka | 1995 | 10.1016/0375-9474(94)00730-B | J,NP/A,583,581,1995 |   | 2JPNKEK | N | Curve | Energy spectrum in arbitrary units |
| Tanihata | 1980 | 10.1016/0370-2693(80)90620-6 | J,PL/B,97,363,1980 |   | 1USABRK | N | Table | Charged particle production cross section |
| Tanihata | 1981 | 10.1016/0370-2693(81)90757-7 | J,PL/B,100,121,1981 |   | 1USABRK | A | Curve |   |
| Tannenwald | 1953 | 10.1103/PhysRev.89.508 | J,PR,89,508,1953 | 14749 | 1USABRK |   |   |   |
| Titarenko | 1998 | 10.1016/S0168-9002(98)00530-0 | J,NIM/A,414,73,1998 | O0900 | 4RUSITE |   |   |   |
| Titarenko | 2002 | 10.1103/PhysRevC.65.064610 | J,PR/C,65,064610,2002 | O0978 | 4RUSITE |   |   |   |
| Titarenko | 2006 | 10.1016/j.nima.2006.02.059 | J,NIM/A,562,801,2006 | O1728 | 4RUSITE |   |   | The NIMA article is not the primary reference. |
| Titarenko | 2008 | 10.1103/PhysRevC.78.034615 | J,PR/C,78,034615,2008 | O1727 | 4RUSITE |   |   |   |
| Tokushuku | 1990 | 10.1016/0370-2693(90)91958-E | J,PL/B,235,245,1990 | E1645 | 2JPNLEP |   |   |   |
| Toshito | 2007 | 10.1103/PhysRevC.75.054606 | J,PR/C,75,054606,2007 | E2053 | 2JPNIRS |   |   |   |
| Trockel | 1988 | 10.1103/PhysRevC.38.576 | J,PR/C,38,576,1988 | O1602 | 2ZZZCER |   |   |   |
| Tull | 1990 | 10.2172/6028607 | R,LBL-29718,1990 |   | 1USABRK | B | Table | Thesis |
| Tyrén | 1957 | 10.1016/0029-5582(57)90051-2 | J,NP,3,52,1957 | O0223 | 2SWDUPP |   |   |   |
| Tyrén | 1966 | 10.1016/0029-5582(66)90149-0 | J,NP,79,321,1966 |   | 1USACHI | A | Curve | Es: Q-value |
| Uozumi | 2007 | 10.1016/j.nima.2006.11.022 | J,NIM/A,571,743,2007 | E2007 | 2JPNOSA |   |   |   |
| Urbon | 1980 | 10.1103/PhysRevC.21.1048 | J,PR/C,21,1048,1980 |   | 1USAANL | N | Curve | Angular distribution in arbitrary units |
| Utsunomiya | 1980 | 10.1016/0375-9474(80)90144-X | J,NP/A,334,127,1980 |   | 2JPNIPC | B | Curve |   |
| Utsunomiya | 1981 | 10.1016/0370-2693(81)91006-6 | J,PL/B,105,135,1981 | E1396 | 2JPNIPC |   |   |   |
| Valentin | 1965 | 10.1016/0029-5582(65)90072-6 | J,NP,62,81,1965 | C0062 | 2FR PAR |   |   |   |
| Van Bibber | 1979 | 10.1103/PhysRevLett.43.840 | J,PRL,43,840,1979 |   | 1USABRK | B | Curve |   |
| Vaz | 1983 | 10.1007/BF01411611 | J,ZP/A,311,89,1983 |   | 1USABRK | B | Curve |   |
| Villagrasa-Canton | 2007 | 10.1103/PhysRevC.75.044603 | J,PR/C,75,044603,2007 | O1507 | 2GERGSI |   |   |   |
| Viyogi | 1979 | 10.1103/PhysRevLett.42.33 | J,PRL,42,33,1979 | C0408 | 1USABRK |   |   |   |
| Volnin | 1975 | 10.1016/0370-2693(75)90371-8 | J,PL/B,55,409,1975 | O0106 | 4RUSLIN |   |   |   |
| Waddington | 1993 | 10.1142/S0218301393000327 | J,IMP/E,2,739,1993 |   | 1USABNL | N |   | Review |
| Waddington | 2000 | 10.1103/PhysRevC.61.024910 | J,PR/C,61,024910,2000 |   | 1USABNL | A | Curve |   |
| Warner | 1980 | 10.1016/0375-9474(80)90379-6 | J,NP/A,341,483,1980 | C0735 | 1CANCRC |   |   |   |
| Warner | 1983 | 10.1016/0375-9474(83)90363-9 | J,NP/A,401,521,1983 | T0178 | 1USAINU |   |   |   |
| Warner | 1992 | 10.1103/PhysRevC.45.2328 | J,PR/C,45,2328,1992 | E1375 | 2JPNOSA |   |   |   |
| Warner | 1992 | 10.1103/PhysRevC.46.616 | J,PR/C,46,616,1992 | E1582 | 2JPNOSA |   |   |   |
| Warwick | 1983 | 10.1103/PhysRevC.27.1083 | J,PR/C,27,1083,1983 |   | 1USABRK | B | Curve |   |
| Watanabe | 1987 | 10.1103/PhysRevC.36.1325 | J,PR/C,36,1325,1987 | E1842 | 2JPNKYU |   |   | Energy spectrum numerical data are in preparation in 2003. |
| Watanabe | 1990 | 10.1007/BF01904164 | J,ZP/A,336,63,1990 | E1844 | 2JPNKYU |   |   |   |
| Watanabe | 1995 | 10.1103/PhysRevC.51.1891 | J,PR/C,51,1891,1995 | E1845 | 2JPNJAE |   |   |   |
| Webb | 1987 | 10.1103/PhysRevC.36.193 | J,PR/C,36,193,1987 |   | 1USABRK | B | Curve |   |
| Webber | 1990 | 10.1086/168268 | J,AJ,348,611,1990 |   |   | N |   | No original measured data given |
| Webber | 1990 | 10.1103/PhysRevC.41.520 | J,PR/C,41,520,1990 |   | 1USABRK | A | Table | Table IV is not for compilation. |
| Webber | 1990 | 10.1103/PhysRevC.41.533 | J,PR/C,41,533,1990 | C1546 | 1USABRK |   |   |   |
| Webber | 1990 | 10.1103/PhysRevC.41.547 | J,PR/C,41,547,1990 |   | 1USABRK | A | Table |   |
| Webber | 1998 | 10.1086/306445 | J,AJ,508,940,1998 |   | 2FR SAT | A | Table |   |
| Webber | 1998 | 10.1086/306446 | J,AJ,508,949,1998 |   | 2FR SAT | A | Table |   |
| Webber | 1998 | 10.1103/PhysRevC.58.3539 | J,PR/C,58,3539,1998 |   | 2FR SAT | A | Table | Numerical data avialable as PAPS PRVCAN-58-074812 |
| Weber | 1992 | 10.1007/BF01291599 | J,ZP/A,343,67,1992 |   | 2GERGSI | A | Table |   |
| Weber | 1994 | 10.1016/0375-9474(94)90766-8 | J,NP/A,578,659,1994 |   | 2GERGSI | B | Curve |   |
| Wefel | 1979 | 10.1103/PhysRevC.19.1380 | J,PR/C,19,1380,1979 |   | 1USAPTN | A | Table |   |
| Wesick | 1985 | 10.1103/PhysRevC.32.1474 | J,PR/C,32,1474,1985 | C0832 | 1USAINU |   |   |   |
| West | 1966 | 10.1103/PhysRev.141.1033 | J,PR,141,1033,1966 | C0971 | 1USAWAS |   |   |   |
| Westerberg | 1978 | 10.1103/PhysRevC.18.796 | J,PR/C,18,796,1978 |   | 1USAORL | A | Curve |   |
| Westfall | 1979 | 10.1103/PhysRevC.19.1309 | J,PR/C,19,1309,1979 | C0407 | 1USABRK |   |   |   |
| Westfall | 1979 | 10.1103/PhysRevLett.43.1859 | J,PRL,43,1859,1979 |   | 1USABRK | A | Curve |   |
| Westfall | 1982 | 10.1016/0370-2693(82)90988-1 | J,PL/B,116,118,1982 |   | 1USABRK | B | Curve |   |
| Westfall | 1984 | 10.1103/PhysRevC.29.861 | J,PR/C,29,861,1984 |   | 1USAMSU | A | Curve |   |
| Whitfield | 1993 | 10.1103/PhysRevC.47.1636 | J,PR/C,47,1636,1993 | T0201 | 1USAMSU |   |   |   |
| Wickersham | 1957 | 10.1103/PhysRev.107.1050 | J,PR,107,1050,1957 | C1998 | 1USABRK |   |   |   |
| Wilczyński | 1980 | 10.1103/PhysRevLett.45.606 | J,PRL,45,606,1980 |   | 2NEDKVI | B | Table |   |
| Wlazlo | 2000 | 10.1103/PhysRevLett.84.5736 | J,PRL,84,5736,2000 | O0833 | 2GERGSI |   |   |   |
| Wright | 1950 | 10.1103/PhysRev.79.838 | J,PR,79,838,1950 | P0066 | 1USABRK |   |   |   |
| Wu | 1979 | 10.1103/PhysRevC.19.698 | J,PR/C,19,698,1979 | O0137 | 1USAMRY |   |   |   |
| Yamada | 1979 | 10.1103/PhysRevLett.43.605 | J,PRL,43,605,1979 |   | 1USATAM? | N | Curve | Energy spectrum in arbitrary units |
| Yamaguchi | 2006 | 10.1103/PhysRevC.74.044608 | J,PR/C,74,044608,2006 |   | 2GERGSI | B | Table |   |
| Yamaguchi | 2010 | 10.1103/PhysRevC.82.014609 | J,PR/C,82,014609,2010 | E2283 | 2JPNIRS |   |   |   |
| Yashima | 2003 | 10.1524/ract.91.12.689.23423 | J,RCA,91,689,2003 | E1829 | 2JPNIRS |   |   |   |
| Yashima | 2004 | 10.1016/j.nimb.2004.06.025 | J,NIM/B,226,243,2004 | E1923 | 2JPNIRS |   |   |   |
| Yennello | 1991 | 10.1103/PhysRevLett.67.671 | J,PRL,67,671,1991 |   | 2FR SAT | N | Curve | Gated by multiplicity |
| Yennello | 1993 | 10.1103/PhysRevC.48.1092 | J,PR/C,48,1092,1993 |   | 2FR SAT | A | Curve |   |
| Yiou | 1968 | 10.1051/anphys/196814030169 | J,APN,14,169,1968 |   | 2ZZZCER+ | A | Table | Tables III,IV,V in C0395. Tabl VI: ? |
| Yiou | 1969 | 10.1029/JA074i009p02447 | J,JGR,74,2447,1969  | C0395 | 2FR PAR+ |   |   | FACILITY: 2FR CSN -> 2FR PAR and 2ZZZCER |
| Yokoyama | 2001 | 10.1524/ract.2001.89.11-12.703 | J,RCA,89,703,2001 | E2074 | 2JPNIRS |   |   |   |
| Yule | 1960 | 10.1103/PhysRev.118.1591 | J,PR,118,1591,1960 | C0700 | 1USACHI |   |   |   |
| Zamani | 2010 | 10.1103/PhysRevC.82.044605 | J,PR/C,82,044605,2010 |   | 4ZZZDUB | B | Table  | Nonelastic rather than "inelastic"? |
| Zeitlin | 1997 | 10.1103/PhysRevC.56.388 | J,PR/C,56,388,1997 |   | 1USABNL | B | Table |   |
| Zeitlin | 2001 | 10.1103/PhysRevC.64.024902 | J,PR/C,64,024902,2001 |   | 2JPNIRS | A | Table |   |
| Zeitlin | 2007 | 10.1016/j.nuclphysa.2006.10.088 | J,NP/A,784,341,2007 | E2010 | 2JPNIRS+ |   |   |   |
| Zeitlin | 2007 | 10.1103/PhysRevC.76.014911 | J,PR/C,76,014911,2007 | C1581 | 2JPNIRS |   |   |   |
| Zeitlin | 2008 | 10.1103/PhysRevC.77.034605 | J,PR/C,77,034605,2008 | C1609 | 2JPNIRS+ |   |   |   |
| Zeitlin | 2011 | 10.1103/PhysRevC.83.034909 | J,PR/C,83,034909,2011 |   | 2JPNIRS+ | B | Table |   |
| Zhou | 2010 | 10.1103/PhysRevC.82.024601 | J,PR/C,82,024601,2010 | 32684 | 3CPRAEP |   |   |   |
| Zhu | 1991 | 10.1103/PhysRevC.44.R582 | J,PR/C,44,582,1991 | C1442 | 1USAINU |   |   |   |