



Particle Irradiation Data Ensemble: Overview table

Explanations

- a. Number of ion experiments within the publication
- b. Cell class: n = normal cells, t = tumor cells
- c. Cell cycle: a = asynchronous, s = synchronized in a particular phase of cell cycle
- d. Cell origin: h = human, r = rodent
- e. Irradiation conditions: m = monoenergetic; s = SOBP
- f. Values are in *italic* if not given in the publications, but derived by stopping power codes
- g. Photon reference radiation: X-ray energy in kVp or photon energy in MV for clinical accelerators if this unit is given, or Co = ^{60}Co and Cs = ^{137}Cs source.
- h. Remarks: For spread out Bragg peaks, the quantities LET_T and LET_D refer to track and dose averaged LET values, respectively. Also other additional information, e.g. on the origin of photon reference curves, is given in this column.

| No. | Author / Year / Reference | No. s.c. ^a | | Cell lines ^b | Cell cycle ^c | Cell origin ^d | Ion species | Irr. cond. ^e | LET (keV/μm) ^f | E (MeV/u) ^f | Phot. ^g | Remarks ^h |
|-----|-------------------------------|-----------------------|---|-------------------------|-------------------------|--------------------------|--|-------------------------|---------------------------|------------------------|--------------------|---------------------------|
| 1 | Chapman et al., 1977 [1] | 13 | V79 | n | s | r | ⁴ He, ¹² C, ²⁰ Ne, ⁴⁰ Ar | s | 2.34 - 403 | 23.4 - 400 | 220 | <LET _T > given |
| 2 | Chapman et al., 1978 [2] | 9 | V79, T1 | n | a, s | h, r | ¹² C | s | 12.2 - 75.0 | 26.1 - 319 | 220 | <LET _T > given |
| 3 | Blakely et al., 1979 [3] | 24 | T1 | n | a | r | ¹² C, ²⁰ Ne, ⁴⁰ Ar | m | 11 - 640 | 10.7 - 680 | 220 | |
| 4 | Raju et al., 1991 [4] | 5 | CHO-10B, HS-23, C3H_10T1/2, V79, AG1522 | n | a | r | ⁴ He | m | 121 - 136 | 0.65 - 0.8 | Co | |
| 5 | Goodhead et al., 1992 [5] | 10 | HeLa, HeLa S3, C3H 10 T1/2 | n | a | h, r | ¹ H, ⁴ He | m | 20.3 - 23.9 | 1.16 - 8.8 | 250 | |
| 6 | Folkard et al., 1996 [6] | 10 | V79 | n | a | r | ¹ H, ² H, ³ He, ⁴ He, ¹² C, ¹⁶ O | m | 10.1 - 105.8 | 0.47 - 3.7 | 240 | |
| 7 | Eguchi-Kasai et al., 1996 [7] | 22 | irs1, irs2, L5178Y, M10, LTA, SL3-147 | n | a | r | ⁴ He, ¹² C, ²⁰ Ne | m | 18 - 327 | 3.1 - 123 | 200 | |
| 8 | Suzuki et al., 1997 [8] | 7 | HE20 | n | s | h | ²⁰ Ne | m | 63 - 335 | 14.3 - 120 | Cs | |
| 9 | Bettega et al., 1998 [9] | 8 | C3H 10T1/2 | n | a | r | ¹ H, ² H | m | 11 - 33.2 | 0.72 - 3.18 | Co | |
| 10 | Tsuboi et al., 1998 [10] | 20 | NB1RGB, ONS-76, A-172, U251MG, TK-1 | n, t | a | h | ¹² C | m | 20 - 105 | 17.4 - 144 | Cs | |
| 11 | Tsuchida et al., 1998 [11] | 6 | A172, TK1 | t | a | h | ¹² C | m | 20 - 80 | 24.1 - 144 | Cs | |
| 12 | Weyrather et al., 1999 [12] | 21 | V79, CHO-K1, xrs5 | n | a | r | ¹² C | m | 13.7 - 482.7 | 2.4 - 266.4 | 250 | |
| 13 | Furusawa et al., 2000 [13] | 139 | V79, HSG, T1 | n | a | h, r | ³ He, ¹² C, ²⁰ Ne | m | 18.5 - 654 | 1.27 - 131 | 200 | |

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|----|-------------------------------|----|---|------|---|------|---|------|---------------|-------------|------------|---|
| 14 | Suzuki et al., 2000 [14] | 32 | NB1RGB, HFL-III, LC-1sq, A-549, C32TG, Marcus, U-251MGKO, SK-MG-1, KNS-89, KS-1, A-172, ONS-76, KNS-60, Becker, T98G, SF126 | n, t | a | h | ^{12}C | m | 13.3 - 77.1 | 25.1 - 271 | 200 | |
| 15 | Belli et al., 2000 [15] | 12 | HF19, M10, SCC25, SQ20B | n, t | a | h | ^1H | m | 7.7 - 33 | 0.69 - 5.24 | Co | |
| 16 | Tsuruoka et al., 2005 [16] | 40 | NB1RGB | n | a | h | ^{12}C , ^{20}Ne , ^{28}Si , ^{56}Fe | m | 13 - 400 | 19.5 - 500 | 200 | |
| 17 | Belli et al., 2008 [17] | 37 | HF19, M10, SCC25, SQ20B, V79 | n, t | a | h, r | ^{12}C | m, s | 13 - 303 | 4.5 - 290 | Cs/Co | <LET _D > given |
| 18 | Belli et al., 1998 [18] | 6 | V79 | n | a | r | ^1H | m | 7.7 - 37.8 | 0.57 - 5.01 | N/A | Data in parts taken from Belli <i>et al.</i> , 1993 [18b] |
| 19 | Hall et al., 1977 [19] | 3 | V79 | n | a | r | ^{40}Ar | s | 110.9 - 409.2 | 48 - 330 | 250 | <LET _D > given |
| 20 | Bird and Burki, 1975 [20] | 6 | V79 | n | a | r | ^4He , ^7Li , ^{11}B , ^{12}C , ^{20}Ne , ^{40}Ar | m | 19.1 - 2000 | 5.09 - 9.93 | 145 | X-ray curve taken from Sinclair and Morton, 1966 [20b] |
| 21 | v. Neubeck, 2009 [21] | 6 | RAT-1, IEC-6 | n, t | a | r | ^{12}C | m | 13.3 - 163 | 9.9 - 270 | 250 | |
| 22 | Perris et al., 1986 [22] | 2 | V79 | n | a | r | ^1H | m | 6 - 12 | 3 - 7.4 | Co | |
| 23 | Bettega et al., 1983 [23] | 3 | EUE | n | a | h | ^1H | m | 1.83 - 5.8 | 8 - 31 | Co | Photon data taken from Bettega <i>et al.</i> , 1979 [23b] |
| 24 | Cox et al., 1977 [24] | 4 | V79, HF19 | n | a | h, r | ^4He | m | 20 - 68 | 1.9 - 8.8 | Co/ 250 | |
| 25 | Wouters et al., 1996 [25] | 11 | V79 | n | a | r | ^1H | s | 2.33 - 6.23 | 6.8 - 22.8 | Co | <LET _D > given |
| 26 | Combs et al., 2009 [26] | 4 | U87-MG, LN229 | t | a | h | ^{12}C | m, s | 103 - 170 | 9.8 - 18 | 250 | <LET _D > given |

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|----|--------------------------------|----|--------------|------|------|------|--|---|-------------|-------------|------|---|
| 27 | Kitajima et al., 2010 [27] | 8 | SuSa, AT10S | n | s | h | ^{12}C | m | 24 - 200 | 35 - 450 | 150 | |
| 28 | Blomquist et al., 1993 [28] | 2 | LS-147T, V79 | n, t | a | h, r | ^1H | s | 4 | 11.6 | Co | <LET _D > given |
| 29 | Yang et al., 1985 [29] | 9 | C3H 10T1/2 | n | a | r | ^{12}C , ^{20}Ne , ^{28}Si , ^{56}Fe , ^{238}U | m | 10.5 - 2080 | 103 - 990 | 225 | E and LET from remaining range |
| 30 | Miller et al., 1995 [30] | 10 | C3H 10T1/2 | n | a | r | ^1H , ^2H , ^3He , ^4He , ^{12}C , ^{16}O | m | 3.8 - 418 | 0.28 - 12.9 | 250 | |
| 31 | Czub et al., 2008 [31] | 4 | CHO | n | a | r | ^{12}C , ^{20}Ne | m | 438 - 1245 | 1.69 - 2.81 | Co | |
| 32 | Kamlah et al., 2011 [32] | 1 | A594 | t | a | h | ^{12}C | m | 168 | 9.9 | 6 MV | |
| 33 | Aoki et al., 2000 [33] | 6 | V79 | n | a | r | ^{12}C | m | 13 - 237 | 6.4 - 283 | 200 | |
| 34 | Han et al., 1998 [34] | 6 | SHE | n | a | r | ^{12}C , ^{26}Si | m | 13 - 400 | 18.5 - 283 | 250 | |
| 35 | Hamada et al., 2010 [35] | 8 | H1299 | t | a | h | ^{12}C , ^{20}Ne , ^{26}Si , ^{40}Ar , ^{56}Fe | m | 13 - 200 | 20 - 600 | 200 | |
| 36 | Claesson et al., 2011 [36] | 6 | V79 | n | a, s | r | ^4He | m | 110 | 0.8 | 100 | |
| 37 | Wedenberg et al., 2010 [37] | 5 | T1 | n | a | h | ^4He | m | 25 - 165 | 0.46 - 6.8 | 250 | |
| 38 | Miller et al., 1990 [38] | 1 | C3H 10T1/2 | n | a | h | ^2H | m | 40 | 0.55 | 250 | Photon data taken from Miller, 1995 [38b] |
| 39 | Tobias et al., 1980 [39] | 2 | V79 | n | s | r | ^{40}Ar | m | 370 | 55 | 220 | E and LET from remaining range |
| 40 | Cox and Masson, 1979 [40], | 7 | HF19 | n | a | h | ^4He , ^{11}B , ^{14}N | m | 20 - 470 | 1.24 - 10.3 | 250 | |
| 41 | Ito et al., 2006 [41] | 7 | HL-60 | t | a | h | ^{12}C , ^{26}Si , ^{56}Fe | m | 20 - 440 | 26 - 143 | 4 MV | |
| 42 | Tilly et al., 1999 [42] | 3 | V79 | n | a | r | ^4He , ^{14}N | m | 6 - 165 | 14.4 - 39 | Co | |

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|----|--------------------------------|-----|---|---|---|---|---|---|--------------|-------------|------|--|
| 43 | Thacker et al., 1979 [43] | 6 | V79 | n | a | r | ^4He , ^{11}B , ^{14}N | m | 28 - 470 | 1.24 - 10.3 | Co | |
| 44 | Hirayama et al., 2009 [44] | 5 | V79 | n | a | r | ^{12}C , ^{56}Fe | m | 20 - 2106 | 16 - 416 | 200 | |
| 45 | Hirayama et al., 2005 [45] | 1 | CHO | n | a | r | ^{12}C | m | 79.6 | 24 | 200 | |
| 46 | Curtis et al., 1982 [46] | 28 | R-1 | t | a | r | ^{12}C , ^{20}Ne , ^{40}Ar | s | 11 - 750 | 19.5 - 428 | 225 | <LET _D > given |
| 47 | Boehrsen et al.,2002 [47] | 2 | V79 | n | a | r | ^{12}C | m | 27.5 - 153 | 10.2 - 92.5 | 6 MV | |
| 48 | Fournier et al., 2001 [48] | 4 | AG1522B, PS1 | n | a | h | ^{12}C , ^{48}Ni | m | 16.6 - 2455 | 9.9 - 195 | 250 | |
| 49 | Wulf et al., 1985 [49] | 106 | B14FAF28, V79 | n | a | r | ^{12}C , ^{16}O , ^{40}Ca , ^{40}Ar , ^{48}Ti , ^{56}Fe , ^{58}Ni , ^{84}Kr , ^{132}Xe , ^{142}Nd , ^{208}Pb , ^{238}U | m | 150 - 15800 | 0.1 - 400 | N/A | Photon parameters taken from Wulf, 1983 [49b] and Kraft, 1987 [49c] |
| 50 | Scholz , 2003 [50] | 8 | CHO, V79 | n | a | r | ^{12}C , ^{16}O , ^{20}Ne , ^{238}U | m | 13.3 - 16500 | 5 - 396 | 250 | Photon parameters adapted from Weyrather <i>et al.</i> , 1999 [50b] |
| 51 | Persson et al., 2002 [51] | 3 | AA | t | a | h | ^{10}B | m | 40 - 160 | 6.6 - 36.6 | Co | |
| 52 | Yang and Tobias, 1984 [52] | 2 | C3H 10 T1/2 | n | a | r | ^{56}Fe , ^{238}U | m | 500 - 1900 | 300 - 960 | 225 | |
| 53 | Scholz et al., 1997 [53] | 8 | CHO | n | a | r | ^{12}C , ^{16}O | m | 13.5 - 265 | 11 - 395 | 250 | |
| 54 | Prise et al., 1990 [54] | 4 | V79 | n | a | r | ^1H , ^4He | m | 16.9 - 108 | 0.76 - 1.9 | 250 | |
| 55 | Terato et al., 2008 [55] | 4 | AA8 | n | a | r | ^{12}C | m | 13 - 200 | 43 - 290 | Co | |
| 56 | Suzuki et al., 1996 [56] | 8 | HE | n | s | h | ^{12}C | m | 22 - 230 | 6.6 - 126 | Cs | |
| 57 | Matsumoto et al., 2008 [57] | 6 | C32TG, Colo679, HMFV-I, HMFV-II, 92-1, MeWo | t | a | h | ^{12}C | s | 50 | 43.4 | 200 | <LET _D > given |

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|----|---------------------------------|----|--|------|---|------|--|-----|-------------|-------------|-----|--|
| 58 | Mehnatl et al., 2005 [58] | 13 | CHO | n | a | r | ^{12}C , ^{20}Ne , ^{40}Ar , ^{56}Fe | m | 20 - 2000 | 13 - 144 | 200 | |
| 59 | Stenerloew et al., 1995 [59] | 10 | HT7, B16, IGR, V79, LS-174T, U-343MG, DU-145 | n, t | a | h, r | ^4He , ^{14}N | s,m | 40 - 125 | 3.82 - 20.3 | Co | Unclear if <LET _T > or <LET _D > given |
| 60 | Okayasu et al., 2006 [60] | 10 | CHO, xrs6, xrs6- hamKu80, HFLIII, 180BR | n | a | h, r | ^{12}C , ^{56}Fe | m | 70 - 200 | 28.5 - 430 | N/A | |
| 61 | Tsuboi et al., 2007 [61] | 9 | U87MG, TK1 | n, t | a | h | ^{12}C | m | 20 - 80 | 24 - 144 | Cs | |
| 62 | Todd, 1975 [62] | 10 | ChangHL, M3-1 | n | a | h, r | ^7Li , ^{11}B , ^{12}C , ^{14}N , ^{16}O , ^{20}Ne , ^{40}Ar | m | 55 - 1940 | 5.3 - 7 | 50 | |
| 63 | Hall et al., 1972 [63] | 1 | V79 | n | a | r | ^4He | m | 106 | 1.3 | 210 | |
| 64 | Takahashi et al., 2000 [64] | 8 | A172, A172neo, A172mp53, TG98G | t | a | h | ^4He , ^{12}C | s | 70 - 156 | 0.51 - 28.5 | 150 | <LET _D > given |
| 65 | Takahashi et al., 2004 [65] | 12 | H1299wtp53, H1299tp53, H1299tp53-null | t | a | h | ^{12}C | m | 30 - 100 | 18.5 - 83 | 200 | |
| 66 | Matsuzaki et al., 1998 [66] | 3 | OCUB-M, CRL-1500, YMB-1 | t | a | h | ^{12}C | s | 80 | 24 | 200 | <LET _D > given |
| 67 | Kronenberg et al., 2009 [67] | 1 | Aprt | n | a | r | ^{56}Fe | m | 151.4 | 1000 | 150 | |
| 68 | Hamada et al., 2006 [68] | 6 | AG01522 | n | a | h | ^4He , ^{12}C , ^{20}Ne , ^{40}Ar | m | 16.2 - 1610 | 7 - 25.5 | Co | |
| 69 | Zhou et al., 2006 [69] | 1 | V79 | n | a | r | ^{12}C | m | 100 | 18.5 | 200 | |
| 70 | Jenner et al., 1993 [70] | 1 | V79 | n | a | r | ^4He | m | 120 | 0.81 | Co | |
| 71 | Furusawa et al., 2002 [71] | 2 | V79 | n | a | r | ^{40}Ar , ^{58}Fe | m | 86 - 442 | 115 - 575 | 150 | |
| 72 | Takahashi et al., 2001 [72] | 8 | SASmp53, SASneo | t | a | h | ^{12}C | m | 30 - 150 | 11 - 83 | 150 | |

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| 73 | Bettega et al., 2005 [73] | 5 | AG1522 | n | a | h | ^{26}Si , ^{48}Ti , ^{56}Fe | m | 56 - 442 | 20 - 1000 | Co | |
| 74 | Ibañez et al., 2009 [74] | 3 | B16-F0 | t | a | r | ^1H , ^6Li | m | 3.4 - 135 | 2.33 - 14.4 | Cs | |
| 75 | Hellweg et al., 2011 [75] | 2 | HEK | n | a | h | ^{13}C | m | 33.2 - 73.2 | 27.8 - 72.4 | 150 | |
| 76 | Napolitano et al., 1992 [76] | 1 | C3H 10T1/2 | n | s | r | ^4He | m | 177 | 0.45 | 80 | |
| 77 | Hill et al., 2004 [77] | 7 | V79-4, irs1, irs2, irs3, CHO-K1, xrs5 | n | a | r | ^4He | m | 121 | 0.815 | 250 | |
| 78 | Antonelli et al., 2015 [78] | 2 | AG01522 | n | s | h | ^4He , ^{12}C | m | 39.4 - 125 | 0.75 - 58 | Cs | |
| 79 | Bettega et al., 2009 [79] | 3 | CGL1 | n | a | h | ^{12}C | m | 13.8 - 172 | 11.4 - 270 | 15 MV | |
| 80 | Beuve et al., 2008 [80] | 6 | SCC61, SQ20B | t | a | h | ^{12}C , ^{40}Ar | m | 33.6 - 302 | 9.8 - 85 | 250 | |
| 81 | Britten et al., 2012 [81] | 10 | HEP2, V79 | n, t | a | h, r | ^1H | s | 5.3 - 28.8 | 0.9 - 8.6 | 120 | <LET _D > given |
| 82 | Chaudhary et al., 2014 [82] | 24 | AG01522, U-87 | n, t | a | h | ^1H | m, s | 1.11 - 25.9 | 1.02 - 59 | 225 | <LET _D > given |
| 83 | Cox et al., 1977b [83] | 17 | HF19, V79 | n | a | h, r | ^4He , ^{11}B , ^{14}N | m | 20 - 470 | 1.16 - 10.6 | N/A | |
| 84 | Folkard et al., 1989 [84] | 4 | V79 | n | a | r | ^1H , ^4He | m | 17 - 105 | 0.76 - 1.9 | 250 | |
| 85 | Franken et al., 2011 [85] | 1 | SW-1573 | t | a | h | ^4He | m | 130 | 1 | Cs | |
| 86 | Frankenberg-Schwager et al., 2009 [86] | 8 | AA8, irs1SF, UV41, V3 | n | s | r | ^4He | m | 124 | 0.85 | 200 | |
| 87 | Gerelchuluun et al., 2011 [87] | 2 | MOLT4, ONS76 | t | a | h | ^1H | s | 2.2 | 25 | 10 MV | <LET _D > given |
| 88 | Gerelchuluun et al., 2015 [88] | 12 | AA8, irs1, irs1SF, V3, V79, XR1 | n | a | r | ^{12}C , ^1H | s | 2.2 - 50 | 25 - 45 | Cs | <LET _D > given |

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|-----|-----------------------------|----|-------------------------|------|---|------|---|------|-------------|-------------|------|---|
| 89 | Habermehl et al., 2014 [89] | 8 | Hep3B, HepG2, HuH7, PLC | t | a | h | ^{12}C , ^{16}O | s | 112 - 146 | 11.8 - 16.3 | N/A | Unclear if <LET _T > or <LET _D > given |
| 90 | Kraft et al., 1985 [90] | 12 | AT-25F, T1 | t | a | h | ^{28}Si , ^{40}Ar , ^{56}Fe , ^{238}U | m | 118 - 15700 | 8 - 960 | N/A | |
| 91 | Manti et al., 2012 [91] | 2 | AG01522 | n | a | h | ^1H | m, s | 4 - 11 | 3.3 - 12 | 225 | Unclear if <LET _T > or <LET _D > given |
| 92 | Petrović et al., 2010 [92] | 4 | HTB140 | t | a | h | ^1H | s | 2.6 - 18.8 | 1.6 - 20 | Co | Unclear if <LET _T > or <LET _D > given |
| 93 | Raju et al., 1978 [93] | 8 | T1 | n | a | h | ^{12}C , ^{20}Ne , ^{40}Ar , ^4He | m | 1.8 - 183 | 79 - 430 | 250 | |
| 94 | Hamada et al., 2008 [94] | 12 | Bcl-2, Neo | t | a | h | ^{12}C , ^{20}Ne , ^{40}Ar , ^4He | m | 16.2 - 1610 | 11.5 - 26.7 | Co | |
| 95 | Słonina et al., 2014 [95] | 12 | HFIB15, HFIB2, HFIB30 | t | a | h | ^1H | m, s | 2.25 - 7.9 | 5.7 - 24 | 6 MV | <LET _D > given |
| 96 | Takahashi et al., 2014 [96] | 8 | MEF | n | a | r | ^{12}C , ^{20}Ne , ^{40}Ar , ^{56}Fe | m, s | 13 - 1370 | 13 - 500 | 200 | Unclear if <LET _T > or <LET _D > given |
| 97 | Tracy et al., 2015 [97] | 6 | V79 | n | a | r | ^4He | m | 112 - 201 | 0.275 - 1 | Co | |
| 98 | Wada et al., 2013 [98] | 4 | HFL-I, NB1RGB | n | a | h | ^{12}C | m | 13 - 75 | 27 - 90 | 200 | |
| 99 | Weber & Flentje, 1993 [99] | 10 | Caski, V79 | n, t | a | h, r | ^{16}O , ^{20}Ne , ^{40}Ar , ^{132}Xe , ^{197}Au , | m | 250 - 11500 | 5.9 - 14 | Co | |
| 100 | Wouters et al., 2015 [100] | 10 | V79 | n | a | r | ^1H | s | 1.03 - 4.74 | 9.8 - 66 | Co | <LET _D > given |
| 101 | Yashkin et al., 1995 [101] | 1 | Clone431 | n | a | r | ^1H | m | 0.5 | 179 | Co | |
| 102 | Fournier et al., 2012 [102] | 1 | AG1522D | n | a | h | ^{12}C | m | 290 | 4.8 | 250 | |
| 103 | Antoccia et al., 2009 [103] | 1 | HFFF2 | n | a | h | ^1H | m | 24.5 | 0.8 | 250 | |
| 104 | Baggio et al., 2002 [104] | 6 | DLD1, HCT116 | t | a | h | ^1H , ^4He | m | 7.7 - 101.7 | 1 - 5.2 | Co | |

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|-----|--------------------------------|----|--|------|---|------|---|------|--------------|-------------|------|---|
| 105 | Bird et al., 1980 [105] | 16 | V79 | n | s | r | $^1\text{H}, ^2\text{H}, ^3\text{He}$ | m | 10.2 - 170 | 0.46 - 4 | 250 | |
| 106 | Doria et al., 2012 [106] | 5 | V79 | n | a | r | ^1H | m | 10 - 28 | 0.9 - 3.82 | 225 | |
| 107 | Hei et al., 1988 [107] | 3 | HSF | n | a | h | $^1\text{H}, ^2\text{H}$ | m | 10 - 40 | 0.5 - 3.82 | Cs | |
| 108 | Inada et al., 1981 [108] | 2 | HMF | t | a | h | ^1H | m | 1.3 - 13.5 | 2.57 - 50.8 | 200 | |
| 109 | Jeynes et al., 2013 [109] | 2 | V79 | n | a | r | $^1\text{H}, ^4\text{He}$ | m | 17.6 - 123 | 1 - 2 | 300 | |
| 110 | Ogata et al., 2005 [110] | 2 | HT1080, LM8 | t | a | h, r | ^{12}C | m | 46.6 | 49 | 4 MV | |
| 111 | Petrović et al., 2006 [111] | 1 | HTB140 | t | a | h | ^1H | m | 5.2 | 8.5 | Co | |
| 112 | Ristić-Fira et al., 2011 [112] | 3 | HTB140 | t | a | h | $^1\text{H}, ^{12}\text{C}$ | m, s | 4.71 - 415.3 | 2.98 - 9.5 | Co | Unclear if $\langle\text{LET}_T\rangle$ or $\langle\text{LET}_D\rangle$ given |
| 113 | Schuff et al., 2002 [113] | 11 | PDV, PDVC57, V79 | n, t | a | r | $^1\text{H}, ^6\text{Li}, ^7\text{Li}$ | m | 2.69 - 269 | 0.99 - 20.2 | Cs | |
| 114 | Williams et al., 1978 [114] | 2 | H4, HD1 | t | a | r | ^1H | m | 0.52 | 160 | 130 | |
| 115 | Guan et al., 2015 [115] | 24 | H1437, H460 | t | a | h | ^1H | s | 0.9 - 19 | 1.6 - 74.9 | Cs | $\langle\text{LET}_D\rangle$ given |
| 116 | Bennet et al., 2022 [116] | 3 | NFF28 | n | a | h | ^1H | m | 0.22 - 1.26 | 50 - 1000 | Cs | |
| 117 | Calipel et al., 2015 [117] | 8 | NCM, APFRE19, Sp6.5, MEL270, mu2, TP17, 92.1, MKT-Br | n | a | h | ^{12}C | m | 34 | 75 | 6 MV | |
| 118 | Chapman et al., 1979 [118] | 3 | V79 | n | s | r | $^{12}\text{C}, ^{20}\text{Ne}, ^{40}\text{Ar}$ | s | 40 - 220 | 58.5 - 111 | 250 | $\langle\text{LET}_T\rangle$ given |
| 119 | Chew et al., 2018 [119] | 9 | T98G, U87, LN18 | t | a | h | $^{12}\text{C}, ^{28}\text{Si}$ | m | 55 - 200 | 18.8 - 479 | 200 | |
| 120 | Chew et al., 2019 [120] | 19 | T98G, U87, LN18 | t | a | h | $^4\text{He}, ^{12}\text{C}, ^{20}\text{Ne}$ | m | 2.3 - 100 | 18.8 - 413 | 200 | |

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|-----|------------------------------------|----|-----------------------------------|---|---|---|--|------|------------|------------|------|---------------------------|
| 121 | Furusawa et al., 2017 [121] | 9 | V79 | n | a | r | ^{12}C , ^{28}Si , ^{40}Ar , ^{56}Fe | m | 13 - 860 | 18.8 - 500 | 200 | |
| 122 | Gong et al., 2007 [122] | 1 | SMMC-7721 | t | a | h | ^{12}C | m | 35 | 68 | 8 MV | |
| 123 | Konings et al., 2019 [123] | 1 | MCF-7 | t | a | h | ^{12}C | m | 73 | 27.7 | 320 | |
| 124 | Matsumoto et al., 2018 [124] | 3 | B16/BL6 | t | a | r | ^{12}C | s | 14 - 75 | 26.8 - 254 | 200 | <LET _D > given |
| 125 | Mein et al., 2019 [125] | 6 | Renca | n | a | h | ^4He | m, s | 4.8 - 26.5 | 6.4 - 53.1 | Co | <LET _D > given |
| 126 | Schlag et al., 1981 [126] | 1 | V79 | n | a | r | ^4He | m | 120 | 3.4 | Co | |
| 127 | Staab & Lücke-Huhle, 2004 [127] | 2 | V79-37A | n | a | r | ^{12}C | s | 18 - 60 | 35.2 - 171 | 250 | <LET _D > given |
| 128 | Topsch et al., 2007 [128] | 4 | SiHa, WiDr | t | a | h | ^{12}C | s | 11.5 - 90 | 21.4 - 363 | 250 | <LET _D > given |
| 129 | Wang et al., 2008 [129] | 3 | NHDF, AG1522B | t | a | h | ^{12}C | m | 13.7 - 153 | 11 - 266 | 250 | |
| 130 | Petrovic et al., 2020 [130] | 17 | CRL5876, HTB177, HTB140, MCF-7 | t | a | h | ^1H , ^{12}C | m, s | 4.7 - 747 | 1.8 - 27.4 | Co | <LET _D > given |
| 131 | Sokol et al., 2017 [131] | 17 | CHO | n | a | r | ^{16}O | m | 22 - 670 | 1.9 - 320 | 250 | |
