

# MCNPX Cash Awards

MCNPX is a quality production code and consequently we offer cash awards to the first person reporting any bug<sup>1</sup>. Even the Beta test versions on the MCNPX website are backed by cash awards. Awards range from \$2 - \$20 - €20. Impressively few problems have been found with new capabilities put into MCNPX (the \$20 / €20 awards) since 2001. Most problems (the \$2 awards) have been long-standing minor errors uncovered in the older constituent codes of MCNPX.

## Summary of \$20 MCNPX Cash Awards

1. Cross section plot failure (MCNPX2.4.d). The first nuclide for any particle type was omitted from material cross section plots. \$20 awarded Roger Hill, P-23, LANL (D-10:JSH-2001-09) 11/07/01
2. Built-in dose functions failed (MCNPX2.4.j). \$20 Yuri Franken, Eindhoven University of Technology, Netherlands (D-10:JSH-2002-06) 04/12/02
3. Log interpolation on data cards required lower case "log" (MCNPX2.4.j). \$20 awarded Dick Olsher, LANL HSR-4 (D-10:JSH-2002-07) 04/25/02.
4. Light-ion proton recoil failed with free gas thermal treatment (MCNPX2.5.a). \$20 awarded Tom McLean, LANL HSR-4 (D-10:JSH-2002-101) 08/08/02
5. Preliminary MCNPX25B mix/match did not allow photonuclear production for nuclides not in gdr.dat list, particularly <sup>1</sup>H. \$20 awarded Holly Trelue, LANL D-10) (D-10:JSH-2003-020) 11/26/02.
6. Light-ion recoil biasing caused wrong weights/answers (MCNPX2.5.b). \$20 awarded Martyn Swinhoe, LANL, NIS-5 (D-10:JSH-2003-030) 01/15/03
7. Light-ion recoil energy was off by factor of atomic weight ratio (MCNPX2.5.b). \$20 awarded Martyn Swinhoe, LANL, NIS-5 (D-10:JSH-2003-034) 02/03/03
8. Improper normalization of KCODE and SSR MDATA binary files for mesh tallies (MCNPX2.5.b). \$20 awarded Bernard Verboomen, SCK-CEN, Mol, Belgium (D-10:JSH-2003-036) 02/13/03
9. Typographical error in warning message. \$20 awarded Steven C. van der Marck, NRG, Petten, The Netherlands (D-5:JSH-2003-052) 06/16/03
10. Inadequate storage for lattice fill card caused crash. \$20 awarded Miguel Embid Segura, CIEMAT, Madrid, Spain (GWM) (D-5:JSH-2003-068) 07/14/03

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<sup>1</sup> Cash Award Fine Print: Offer subject to cancellation or modification without notice. A bug is defined as an error in the source code that we choose to correct. We make awards even for the most trivial or insignificant of problems, but not for proposed code enhancements or proposed extended capabilities. Awards are given only to the first MCNPX user reporting a problem. Reported problems must be reproducible and awards are paid when the correction is integrated into a forthcoming MCNPX version. We believe MCNPX and its predecessor codes are the most error-free and robust Monte Carlo radiation transport capabilities available. We challenge you to find a bug!

Note that the cash awards are offered by John S. Hendricks and are not in any way funded, sponsored, or authorized by either Los Alamos National Laboratory or Los Alamos National Security, LLC., or any other person or organization. The awards do not constitute a guarantee or warranty of any kind.

11. Spontaneous fission error when used as multiple source particle. \$20 awarded Martyn Swinhoe, LANL, NIS-5 (D-5:JSH-2003-110) 09/26/03
12. SDEF PAR=d fails in MCNPX2.5.e (thinks d is a distribution). \$20 awarded Laurent Bourgois, CEA Saclay, France (D-5:JSH-2004-036) 03/19/04
13. A delayed neutron was incorrectly created when the prompt neutron fission multiplicity was less than zero (rare case). Occurred only when analog delayed neutrons and fission multiplicity were both on (PHYS:N 3J -1 J -1). €20 awarded Steven van der Marck, NRG, Petten, Netherlands (GWM) (D-5:JSH-2004-084) 06/04/04
14. Antiparticle flag was not properly set for surface source write (SSW). \$20 awarded Falk Poenisch, M. D. Anderson, Houston (GWM) (D-5:JSH-2004-101) 6/17/04
15. Photonuclear FM tallies failed for FM materials not in tallying cell. \$20 awarded Brad Micklich, ANL (GWM) (D-5:JSH-2004-145) 8/18/04
16. Mesh tally plotting in MCNPX failed in some circumstances. \$20 awarded William Schmitt, Draper Labs, Cambridge, MA (JSH) (D-5:JSH-2005-190) 5/3/05
17. KCODE load balance error message format error. €20 awarded Steven van der Marck, NRG, Petten, Netherlands (GWM) (D-5:JSH-2005-239) 6/30/05
18. Crash when mesh tallies were written to backup *runtp*e files. €20 awarded Steven van der Marck, NRG, Petten, Netherlands (D-5:JSH-2006-005) 10/12/05
19. Interactive plotter gave YZ plot instead of XY (alpha version 26a4 only). \$20 awarded Martyn Swinhoe, LANL, NIS-5 (JSH) (D-5:JSH-2006-17) 10/24/05
20. Pulse-Height Tally with Variance Reduction did not run in parallel. \$20 awarded Ronald J. McConn, PNL (GWM) (D-5:JSH-2006-19) 10/24/05
21. PRDMP 5<sup>th</sup> entry cannot be larger than KCODE cycle number. €20 awarded Sergey Belousov, INRNE-BAS, Sofia, Bulgaria (GWM) (D-5:JSH-2006-112) 4/28/06
22. Predictor-corrector burn-up variables improperly saved giving wrong answers in some cases (MCNPX26B only.) €20 awarded Cornelis Broeders, Karlsruhe, Germany (MLF) (X-3:JSH-2006-052) 7/5/06
23. Incorrect ERPRNT format causes crash. \$20 awarded Dudley Raine, III, SAID, McLean, Virginia (GWM/JSH) (X-3:JSH-2007-062) 7/9/07
24. SSW s (-c) construct fails if cell c (the cell from which the particle is departing) is not the lowest level universe. €20 awarded Steven van der Marck, NRG, Petten, Netherlands (JSH) (X-3:JSH-2008-002) 10/3/07
25. Burnup problems sometimes crashed in a preliminary MCNPX26F version. \$20 awarded Bruce Wilkin, AECL, Chalk River, Canada (MLF) (X-3:JSH-2008-029) 2/8/08
26. MCNPX26E did not print out the LAQGSM flag (ILAQ) in Print Table 41. \$20 awarded Kin Yip, BNL (X-3:JSH-2008-044) 3/18/08
27. Floating point variable TDS used in ITALLY do loop (harmless or compile error, depending upon system.) €20 awarded Frank Gunsing, CEA/Saclay, France (JSH) (X-3:JSH-2008-045) 3/31/08
28. The number of secondary particles can exceeded L02 for heavy ions using LAQGSM physics in MCNPX26E. The array sizes have been increased. \$20

awarded to Sukesh Aghara, Prairie View A&M University, Texas (MRJ) (X-3:JSH-2008-046) 4/4/08

### Summary of \$2 MCNPX Cash Awards

1. Bad indexing caused errors if the exponential transform was used in a problem where particles get lost or had other "bad trouble" in MCNP4C. \$2 awarded Steven C. van der Marck, NRG, Petten, Netherlands (D-10:JSH-2001-007)10/31/01
2. Delayed neutron data could overwrite unresolved data when both were used in MCNP4C. \$2 awarded Alfred Hogenbirk, NRG, Petten, Netherlands (D-10:JSH-2001-154) 10/31/01
3. Plots of superimposed weight window mesh did theta backwards for cylindrical meshes in MCNP4C2. \$2 awarded John Wagner, ORNL (D-10:JSH-2002-37) 03/19/02
4. imp:a for particles > h failed on cell cards. Also, imp:x,x,x failed for more than 3 particle types (MCNPX2.4.j). \$2 awarded Eric Williams, Raytheon, Tucson, AZ. (D-10:JSH-2002-05, D-10-02-48) 04/11/02
5. There were spurious lines in postscript geometry plot files (MCNP4C). \$2 awarded Alfred Hogenbirk, NRG, Netherlands. (D-10:JSH-02-083) 7/1/02
6. Mesh tallies required 2 spaces between some entries (MCNPX2.5.b). \$2 awarded Steven J. Grammel, ANL (D-10:JSH-02-097) 07/05/02
7. If sdef repeated structures cell specification did not start at lev=0, code crashed (MCNP4C3). 2 euros to Marc Brenneisen, Schwetzingen, Germany (D-10:JSH-03-019) 12/5/02
8. WWINP file could not be read if ipt>7 data on it (MCNPX2.5.b). \$2 awarded David Lawrence, LANL, NIS-1 (D-10:JSH-2003-029) 12/23/02
9. LEB parameters such as EHIN cannot be increased correctly for CEM. \$2 awarded Paul Goldhagen, USDOE/EML, New York (D-10:JSH-03-015, 3/20/03)
10. Two (unused and harmless) parameters incorrectly set in CEM cdouble.h include. \$2 awarded Tom Jordan, EMPC, Gaithersburg, MD (D-5:JSH-2003-032) (FXG) 04/17/03
11. Heating tally contributions by antineutrons and antiprotons in the data table energy range incorrect. \$2 awarded Martyn Swinhoe, LANL NIS-5. (D-5:JSH-2003-36) 04/19/03
12. Tiny time cutoffs caused bad trouble "event distance = zero" termination. \$2 awarded Kin Yip, BNL. (D-5:JSH-2003-037) 04/19/03
13. MCNP attempts to calculate volumes for point detectors and not for IPT > 3. \$2 awarded Anthony Zukaitis, Bechtel Nevada – LAO. (GWM) (D-5:JSH-2003-065) 7/9/03
14. Array overflow for detectors in rare cases. \$2 awarded Edward J. Waller, University of Ontario Institute of Technology, Oshawa, Ontario, Canada (GWM) (D-5:JSH-2003-069) 07/14/03
15. DXTRAN occasionally fails in repeated structures. \$2 awarded David J. Lawrence, LANL, NIS-1. (GWM) (D-5:JSH-2003-088) 08/18/03

16. INCL4 roundoff errors cause crash. \$2 awarded Dick Olsher, LANL HSR-4. (D-5:JSH-2003-109) 9/26/03
17. Periodic boundaries can fail when there are unused duplicate or macrobody surfaces. \$2 awarded Adam Libal, Westinghouse, Sweden (D-5:JSH-2003-111) 9/26/03
18. Extremely low-energy errors cause crash in INCL4 and ABLA physics models. \$2 awarded Robin Klein Meulekamp, NRG, Netherlands (D-5:JSH-2003-112) 9/26/03
19. A fatal error occurred if an MX card was specified for a material not used in the problem. \$2 awarded was made to Paul Bailey, DOE/EML (D-5:JSH-2003-114) 10/2/03.
20. Mesh tallies crash sometimes if the 1<sup>st</sup> two PRDMP entries are not the same. \$2 awarded Ian Smith, University of Liverpool, UK (D-5:JSH-2003-115) 10/2/03
21. PTRAC cell/surface numbers are wrong with cell/surface flagging. \$2 awarded Valery Taranenko, GSF, Germany (D-5:JSH-2003-127) 11/6/03
22. User input of invalid ZAID can cause PC crash. \$2 awarded Paul Goldhagen, USDOE/EML, New York (D-10:JSH-03-128) 11/07/03
23. TR cards with macrobody surfaces can cause an array overflow. \$2 awarded Kin Yip, BNL. (D-5:JSH-2003-148) 11/24/03
24. Failure to generate weight windows for charged particles. \$2 awarded Ken Burns, ENEA, Bologna, Italy. (D-5:JSH-2003-149) 12/01/03
25. Infinite loop if time cutoffs are different for different particles. \$2 awarded Fan Lei, QinetiQ, Farnborough, UK. (D-5:JSH-2003-154) 12/04/03
26. GRIDCONV would crash or worse if maximum contour > 10. \$2 awarded Seiki Ohnishi, National Maritime Research Institute, Japan. (D-5:JSH-2003-159) 12/11/03
27. An EXPIRE termination saying “wrong material number” could falsely occur in rare cases for electrons below the energy cutoff. \$2 awarded Yuri Franken, Eindhoven University of Technology, Netherlands. (D-5:JSH-2003-163) 12/16/03
28. Incorrect electron angular distributions. \$2 awarded Paul Bailey, DOE/EML. (D-5:JSH-2004-044) (GWM) 03/30/04
29. KCODE with lattices, mode n d, and print 128 crashed – universe map could not handle more than mode n,p,e. \$2 awarded Tak Pui Lou, LBL. (D-5:JSH-2004-074) (GWM) 5/27/04
30. Pulse-height tallies failed for upper level cells in repeated structures. \$2 awarded Valery Taranenko, GSF, Germany. (D-5:JSH-2004-102) (GWM) 6/18/04
31. PTRAC did not print the correct reaction number in some cases. \$2 awarded Caroline Boudou, INSERM, Grenoble, France. (D-5:JSH-2004-138) (GWM) 8/16/04
32. Nuclear data libraries generated with some newer versions of NJOY could have a negative fission flag. (Does not affect LANL data distributed to date.) \$2 awarded Steven van der Marck, NRG, Netherlands (D-5:JSH-05-045) (GWM) 11/30/04
33. Detectors and DXTRAN failed above the table data energy range and can even cause tracking errors. \$2 awarded Paul Goldhagen, EML, US-DHS, New York (D-5:JSH-2005-91) (GWM) 1/14/05

34. C0 cosine defaults only worked with F1 (not F2) tallies. \$2 awarded Fan Lei, QinetiQ, Farnborough, UK (D-5:JSH-2005-092) (GWM) 1/14/05
35. Spurious error messages for input lines continued after fatal errors. \$2 awarded Valery Taranenko, GSF, Germany (D-5:JSH-2005-191) (GWM) 5/10/05
36. Incorrect LAHET cascade error message. \$2 awarded Igor Remec, ORNL (D-5:JSH-2005-238) (GWM) 6/30/05
37. Auger electrons and tally heating from fluorescence neglected when produced by photons below energy cutoff. \$2 awarded Greg Cunningham, ISR-1, LANL (GWM) (D-5:JSH-2006-18) 10/24/05
38. Electron mesh tallies gave no score in void cells. \$2 awarded Carlo Petrovich, ENEA, Bologna, Italy (GWM) (D-5:JSH-2006-101, 4/24/06)
39. Detectors score improperly in lattice geometries causing crash. \$2 awarded Kin Yip, BNL, (GWM) (D-5:JSH-2006-111, 4/27/06)
40. Universe map causes crash in rare cases. \$2 award Ben Amiri, LANL D-5 (GWM) (D-5:JSH-2006-142, 5/26/06)
41. Insufficient space for tallies with T on F card. \$2 award Ben Amiri, LANL D-5 (GWM) (X-3:JSH-2006-053, 7/13/06)
42. Lost particles occur because coincident General Quadratic (GQ) surfaces caused by the Right Elliptical Cylinder (REC) macrobody are not detected. \$2 awarded Richard Starr, NASA/Goddard (GWM) (X-3:JSH-2006-069, 10/26/06)
43. Periodic boundary conditions fail in repeated structures. \$2 awarded Phillippe Maes, Tractebel, Brussels, Belgium (LSW/GWM) (X-3-MCC:JSH-2007-055, 4/15/07)
44. Translations on the mesh tally RMESH or CMESH with a TRANS keyword can fail in all MCNPX versions. \$2 awarded Choonsik Lee, University of Florida (GWM) (X-3-MCC:JSH-2007-56, 4/15/07)
45. Repeated structures lose particles with surfaces sources. \$2 awarded Steven van der Marck, NRG, Petten, Netherlands (GWM) (X-3-MCC:JSH-2007-57, 4/16/07)
46. Repeated structures cells with LAT but no FILL can cause wrong answers. \$2 awarded Mathiew Agelou, CEA, France (GWM)(X-3-MCC:JSH-2007-61, 7/9/07)
47. Correct DATAPATH. If the "hardwired" DATAPATH in the source code is valid and the DATAPATH is not specified anywhere else besides the XSDIR file, then sometimes the hardwired path is incorrectly used. \$2 awarded David Dixon, LANL D-5 (GWM) (X-3:JSH-2008-001, 10/3/07)
48. Heating has always been incorrect for photonuclear particles and their progeny. \$2 awarded Yousry Gohar, ANL (JSH) (X-3:JSH-2008-003, 10/5/07)
49. Enable capitalization of R/C/S MESH card keywords, e.g. RMESH91:p FLUX. \$2 awarded Vitaly D. Kovaltchouk, Bubble Technology Industries, Chalk River, Ontario, Canada (GWM) (X-3:JSH-2008-016, 12/4/07)
50. Enable "I" interpolation on mesh tally (CORAN) coordinate cards. \$2 awarded Brad Micklich, ANL (GWM) (X-3:JSH-2008-019, 12/6/07)
51. Uninitialized value of "\*error flag" in C-routine gawk of MCNPC.C caused MCNPX26E linux not to plot. \$2 awarded Rainer Wilcke, ESRF, Grenoble, France (GWM) (X-3:JSH-2008-030, 2/8/08)

52. Comments in CEM data level.tbl caused MCNPX26E heavy ion problems to hang and “integer\*4 istop” caused I8 compilation to fail. \$2 awarded William Schmitt, Draper Labs, Cambridge, MA (GWM) (X-3:JSH-2008-030, 2/8/08)
53. Multiple errors were printed to the screen and MCNPX26E would eventually stop for heavy ions when assigning LAQGSM particle identifiers. \$2 awarded to Suresh Aghara, Prairie View A&M University, Texas (MRJ) (X-3:JSH-2008-046) 4/4/08
54. Neutrons, protons, or deuterium colliding with neutrons protons, or deuterium at high energies should go to FLUKA, not LAQGSM. \$2 awarded to Suresh Aghara, Prairie View A&M University, Texas (MRJ) (X-3:JSH-2008-048) 4/11/08
55. If a detector tally contribution is from a cell filled with a lattice the mesh type 4 or point detector tallies did not score. \$2 awarded to Róbert Kákonyi, University of Szeged, Hungary (GWM) (X-3:JSH-2008-049) 4/11/08
56. Large problems failed with the INTEL 10 compiler requiring a workaround. \$2 awarded to Manuel Bardies, INSERM, Nantes, France (GWM) (X-3:JSH-2008-050) 4/11/08