UK Nuclear Activity

May 2019 Issue 71

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Newsletter archive: http://npg.dl.ac.uk/OutreachNewsletter/index.html

Nuclear Physics Public Engagement Website: NuclearPhysicsForYou

Nuclear Physics Outreach Poster – order hardcopies from STFC free of charge here

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1. Nuclear Physics Publications for May*

If you are publishing a paper that you think would be of media value please contact Wendy Ellison, STFC Press Officer. She can help with press releases and publicity. If you get in touch with her before publication she can also get material ready in advance for the day of publication.

Phys. Rev. C **99**, 055504 https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.055504

Identification of nuclear effects in neutrino and antineutrino interactions on nuclei using generalized final-state correlations

X. Lu and J.T. Sobczyk

Published 21 May 2019

Phys. Rev. C **99**, 054625 https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.054625

Constraining spectroscopic factors near the r-process path using combined measurements: ^{86}Kr (d,p) ^{87}Kr

D. Walter, S. D. Pain, J. A. Cizewski, F. M. Nunes, S. Ahn, T. Baugher, D. W. Bardayan, T. Baumann, D. Bazin, S. Burcher, K. A. Chipps, G. Cerizza, K. L. Jones, R. L. Kozub, S. J. Lonsdale, B. Manning, F. Montes, P. D. O'Malley, S. Ota, J. Pereira, A. Ratkiewicz, P. Thompson, C. Thornsberry, and S. Williams

Published 24 May 2019

*Also includes missed publications from previous months

Edited by James Benstead, IOP Nuclear Physics Group Committee
james.benstead@awe.co.uk or j.benstead@surrey.ac.uk

Phys. Rev. C **99**, 054617 https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.054617

Isomer yield ratios in ^{184}Re from the ^{9}Be + ^{181}Ta reaction

G. S. Li (李广顺), Y. D. Fang (方永得), A. Diaz-Torres, M. L. Liu (柳敏良), N. T. Zhang (张宁涛), X. H. Zhou (周小红), Y. H. Zhang (张玉虎), J. G. Wang (王建国), B. S. Gao (高丙水), Y. H. Qiang (强赟华), S. Guo (郭松), S. C. Wang (王思成), Z. Y. Zhang (张志远), J. F. Huang (黄吉峰), K. L. Wang (王凯龙), Y. Zheng (郑勇), and S. Mukherjee

Published 16 May 2019

Phys. Rev. C **99**, 054615 https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.054615

Comparative study of the effect of resonances of the weakly bound nuclei ^{6,7}Li on total fusion with light to heavy mass targets

A. Gómez Camacho, A. Diaz-Torres, and H. Q. Zhang

Published 15 May 2019

Phys. Rev. C **99**, 054332 https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.054332

Microscopic structure of coexisting 0^{+} states in ^{68}Ni probed via two-neutron transfer

F. Flavigny[1,2], J. Elseviers[2], A. N. Andreyev[3,4], C. Bauer[5], V. Bildstein[6], A. Blazhev[7], B. A. Brown[8], H. De Witte[2], J. Diriken[2,9], V. N. Fedosseev[10], S. Franchoo[1], R. Gernhäuser[11], M. Huyse[2], S. Ilieva[5], S. Klupp[11], Th. Kröll[5], R. Lutter[11], B. A. Marsh[10], D. Mücher[6,11], K. Nowak[11], T. Otsuka[12,13,14,2], J. Pakarinen[15,16,17], N. Patronis[18], R. Raabe[2], F. Recchia[19], P. Reiter[7], T. Roger[20], S. Sambi[2], M. Seidlitz[7], M. D. Seliverstov[2,10,21], B. Siebeck[7], Y. Tsunoda[14], P. Van Duppen[2], M. Vermeulen[3], M. Von Schmid[5], D. Voulot[10], N. Warr[7], F. Wenander[10], and K. Wimmer[8,*]

Published 31 May 2019

Phys. Rev. C **99**, 054327 https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.054327

Nuclear electromagnetic dipole response with the self-consistent Green's function formalism

Francesco Raimondi and Carlo Barbieri

Published 24 May 2019

Phys. Rev. C **99**, 054326 https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.054326

New spectroscopic information on ^{211,213}Tl: A changing structure beyond the N=126 shell closure

A. Gottardo[1,2,*], J. J. Valiente-Dobón[1], G. Benzoni[3], A. I. Morales[3], A. Gadea[4], S. Lunardi[2,5], P. Boutachkov[6], A. M. Bruce[7], M. Górska[6], J. Grebosz[8], S. Pietri[6], Zs. Podolyák[9], M. Pfützner[10], P. H. Regan[9], D. Rudolph[11], H. Weick[6], J. Alcántara Núñez[12], A. Algora[4], N. Al-Dahan[9], G. de Angelis[1], Y. Ayyad[12], N. Alkhomashi[13], P. R. P. Allegro[14], D. Bazzacco[5], J. Benlliure[15], M. Bowry[9], A. Bracco[3,16], M. Bunce[7], F. Camera[3,16], E. Casarejos[17], M. L. Cortes[6], F. C. L. Crespi[3], A. Corsi[3,16], A. M. Denis Bacelar[7], A. Y. Deo[9], C. Domingo-Pardo[6], M. Doncel[18], Zs. Dombradi[19], T. Engert[6], K. Eppinger[20], G. F. Farrelly[9], F. Farinon[6], H. Geissel[6], J. Gerl[6], N. Goel[6], E. Gregor[6], T. Habermann[6], R. Hoischen[6,11], R. Janik[21], S. Klupp[20], I. Kojouharov[6], N. Kurz[6], S. M. Lenzi[2,5], S. Leoni[3,16], S. Mandal[22], R. Menegazzo[5], D. Mengoni[5], B. Million[3], D. R. Napoli[1], F. Naqvi[6,23], C. Nociforo[6], A. Prochazka[6], W. Prokopowicz[6], F. Recchia[5], R. V. Ribas[14], M. W. Reed[9], E. Sahin[1], H. Schaffner[6], A. Sharma[6], B. Sitar[21], D. Siwal[22], K. Steiger[20], P. Strmen[21], T. P. D. Swan[9], I. Szarka[21], C. A. Ur[5], P. M. Walker[9,24], O. Wieland[3], H-J. Wollersheim[6], F. Nowacki[25], and E. Maglione[26]

Published 23 May 2019

Phys. Rev. C **99**, 054325 https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.054325

Shape coexistence in ^{178}Hg

C. Müller-Gatermann[1,*], A. Dewald[1], C. Fransen[1], K. Auranen[2,†], H. Badran[2], M. Beckers[1], A. Blazhev[1], T. Braunroth[1], D. M. Cullen[3], G. Fruet[4], A. Goldkuhle[1], T. Grahn[2], P. T. Greenlees[2], A. Herzáň[5,6,2], U. Jakobsson[7,2], D. Jenkins[8], J. Jolie[1], R. Julin[2], S. Juutinen[2], J. Konki[2,‡], M. Leino[2], J. Litzinger[1], K. Nomura[9], J. Pakarinen[2], P. Peura[10,2], M. G. Procter[3], P. Rahkila[2], P. Ruotsalainen[11,2], M. Sandzelius[2], J. Sarén[2], C. Scholey[2], J. Sorri[12,2], S. Stolze[2,†], M. J. Taylor[13,3], J. Uusitalo[2], and K. O. Zell[1]

Published 21 May 2019

Phys. Rev. C **99**, 054317 https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.054317

Inverse odd-even staggering in nuclear charge radii and possible octupole collectivity in ^{217,218,219}At revealed by in-source laser spectroscopy

A. E. Barzakh[1,*], J. G. Cubiss[2], A. N. Andreyev[2,3,4], M. D. Seliverstov[1,2], B. Andel[5], S. Antalic[5], P. Ascher[6], D. Atanasov[6], D. Beck[7], J. Bieroń[8], K. Blaum[6], Ch. Borgmann[6], M. Breitenfeldt[9], L. Capponi[10], T. E. Cocolios[4,11], T. Day Goodacre[4,11], X. Derkx[10,12], H. De Witte[9], J. Elseviers[9], D. V. Fedorov[1], V. N. Fedosseev[4], S. Fritzsche[13,14], L. P. Gaffney[9], S. George[6], L. Ghys[9,15], F. P. Heßberger[16,17], M. Huyse[9], N. Imai[4,18], Z. Kalaninová[5,19], D. Kisler[6], U. Köster[20], M. Kowalska[4], S. Kreim[6,4], J. F. W. Lane[10], V. Liberati[10], D. Lunney[21], K. M. Lynch[4,11], V. Manea[4,21], B. A. Marsh[4], S. Mitsuoka[3], P. L. Molkanov[1], Y. Nagame[3], D. Neidherr[7], K. Nishio[3], S. Ota[3], D. Pauwels[15], L. Popescu[15], D. Radulov[9], E. Rapisarda[4], J. P. Revill[22], M. Rosenbusch[23,24], R. E. Rossel[4,25], S. Rothe[4,25], K. Sandhu[10], L. Schweikhard[23], S. Sels[9], V. L. Truesdale[2], C. Van Beveren[9], P. Van den Bergh[9], P. Van Duppen[9], Y. Wakabayashi[3], K. D. A. Wendt[25], F. Wienholtz[23,4], B. W. Whitmore[2], G. L. Wilson[2], R. N. Wolf[6,†], and K. Zuber[26]

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Phys. Rev. C **99**, 054307 https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.054307

Fine structure in the α decay of ^{156}Lu and ^{158}Ta

E. Parr[1,*], R. D. Page[1], D. T. Joss[1], F. A. Ali[1,†,‡], K. Auranen[2,§], L. Capponi[3,4,‖], T. Grahn[2], P. T. Greenlees[2], J. Henderson[5,¶], A. Herzáň[6,2], U. Jakobsson[2], R. Julin[2], S. Juutinen[2], J. Konki[2,**], M. Labiche[7], M. Leino[2], P. J. R. Mason[7], C. McPeake[1], D. O'Donnell[1,††], J. Pakarinen[2], P. Papadakis[1], J. Partanen[2], P. Peura[2], P. Rahkila[2], J. P. Revill[1], P. Ruotsalainen[2], M. Sandzelius[2], J. Sarén[2], C. Scholey[2], J. Simpson[7], J. F. Smith[3,4], M. Smolen[3,4], J. Sorri[2,§§], S. Stolze[2,§], A. Thornthwaite[1], and J. Uusitalo[2]

Published 9 May 2019

Phys. Rev. C **99**, 054306 https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.054306

Fusion reaction ^{48}Ca+^{249}Bk leading to formation of the element Ts (Z=117)

J. Khuyagbaatar[1,2,*], A. Yakushev[2], Ch. E. Düllmann[1,2,3], D. Ackermann[2,†], L.-L. Andersson[1], M. Asai[4], M. Block[2], R. A. Boll[5], H. Brand[2], D. M. Cox[6,‡], M. Dasgupta[7], X. Derkx[1,3], A. Di Nitto[3], K. Eberhardt[1,3], J. Even[1,§], M. Evers[7], C. Fahlander[8], U. Forsberg[8], J. M. Gates[9], N. Gharibyan[10], P. Golubev[8], K. E. Gregorich[9], J. H. Hamilton[11], W. Hartmann[2], R.-D. Herzberg[6], F. P. Heßberger[1,2], D. J. Hinde[7], J. Hoffmann[2], R. Hollinger[2], A. Hübner[2], E. Jäger[2], B. Kindler[2], J. V. Kratz[3], J. Krier[2], N. Kurz[2], M. Laatiaoui[2], S. Lahiri[12], R. Lang[2], B. Lommel[2], M. Maiti[12,‖], K. Miernik[5], S. Minami[2], A. Mistry[6,¶], C. Mokry[1,3], H. Nitsche[9,**], J. P. Omtvedt[13], G. K. Pang[9], P. Papadakis[6,14], D. Renisch[3], J. Roberto[5], D. Rudolph[8], J. Runke[2], K. P. Rykaczewski[5], L. G. Sarmiento[8], M. Schädel[2,4], B. Schausten[2], A. Semchenkov[13], D. A. Shaughnessy[10], P. Steinegger[15,16], J. Steiner[2], E. E. Tereshatov[10,††], P. Thörle-Pospiech[1,3], K. Tinschert[2], T. Torres De Heidenreich[2], N. Trautmann[3], A. Türler[15,16], J. Uusitalo[14], D. E. Ward[8], M. Wegrzecki[17], N. Wiehl[1,3], S. M. Van Cleve[5], and V. Yakusheva[1]

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Phys. Rev. Lett. **122**, 172502 https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.122.172502

Direct Observation of Proton-Neutron Short-Range Correlation Dominance in Heavy Nuclei

M. Duer[1], A. Schmidt[2], J. R. Pybus[2], E. P. Segarra[2], A. Hrnjic[2], A. W. Denniston[2], R. Weiss[3], O. Hen[2,*], E. Piasetzky[1], L. B. Weinstein[4], N. Barnea[3], I. Korover[48], E. O. Cohen[1], H. Hakobyan[5], S. Adhikari[17], Giovanni Angelini[19], M. Battaglieri[23], A. Beck[2,†], I. Bedlinskiy[27], A. S. Biselli[15,9], S. Boiarinov[41], W. Brooks[5], V. D.

Burkert[41], F. Cao[13], D. S. Carman[41], A. Celentano[23], T. Chetry[34], G. Ciullo[21,16], L. Clark[42], P. L. Cole[30,20,10], M. Contalbrigo[21], O. Cortes[19], V. Crede[18], R. Cruz Torres[2], A. D'Angelo[24,37], N. Dashyan[46], E. De Sanctis[22], R. De Vita[23], A. Deur[41], S. Diehl[13], C. Djalali[34,39], R. Dupre[26], Burcu Duran[40], H. Egiyan[41], A. El Alaoui[5], L. El Fassi[31], P. Eugenio[18], A. Filippi[25], T. A. Forest[20], G. P. Gilfoyle[36], K. L. Giovanetti[28], F. X. Girod[41], E. Golovatch[38], R. W. Gothe[39], K. A. Griffioen[45], L. Guo[17,41], K. Hafidi[6,46], C. Hanretty[41], N. Harrison[41], M. Hattawy[4], F. Hauenstein[4], T. B. Hayward[45], D. Heddle[12,41], K. Hicks[34], M. Holtrop[32], Y. Ilieva[39,19], D. G. Ireland[42], B. S. Ishkhanov[38], E. L. Isupov[38], H. S. Jo[29], K. Joo[13], M. L. Kabir[31], D. Keller[44], M. Khachatryan[4], A. Khanal[17], M. Khandaker[33,‡], W. Kim[29], F. J. Klein[10], V. Kubarovsky[41,35], S. E. Kuhn[4], L. Lanza[24], G. Laskaris[2], P. Lenisa[21], K. Livingston[42], I. J. D. MacGregor[42], D. Marchand[26], N. Markov[13], B. McKinnon[42], S. Mey-Tal Beck[2,†], M. Mirazita[22], V. Mokeev[41,38], R. A. Montgomery[42], A. Movsisyan[21], C. Munoz Camacho[26], B. Mustapha[6], P. Nadel-Turonski[41], S. Niccolai[26], G. Niculescu[28], M. Osipenko[23], A. I. Ostrovidov[18], M. Paolone[40], R. Paremuzyan[32], K. Park[29,§], E. Pasyuk[41,7], M. Patsyuk[2], W. Phelps[19], O. Pogorelko[27], Y. Prok[4,44], D. Protopopescu[42], M. Ripani[23], A. Rizzo[24,37], G. Rosner[42], P. Rossi[41,22], F. Sabatié[11], B. A. Schmookler[2], R. A. Schumacher[9], Y. Sharabian[41], Iu. Skorodumina[39,38], D. Sokhan[42], N. Sparveris[40], S. Stepanyan[41], S. Strauch[39,19], M. Taiuti[23,47], J. A. Tan[29], N. Tyler[39], M. Ungaro[41,35], H. Voskanyan[46], E. Voutier[26], R. Wang[26], X. Wei[41], M. H. Wood[8,39], N. Zachariou[43], J. Zhang[44], Z. W. Zhao[14], and X. Zheng[44]

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Phys. Rev. Lett. **122**, 192502 https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.122.192502

Laser Spectroscopy of Neutron-Rich Tin Isotopes: A Discontinuity in Charge Radii across the N=82 Shell Closure

C. Gorges[1,*], L. V. Rodríguez[2,†], D. L. Balabanski[3], M. L. Bissell[4], K. Blaum[5], B. Cheal[6], R. F. Garcia Ruiz[7,8,4], G. Georgiev[2], W. Gins[7,‡], H. Heylen[5,8], A. Kanellakopoulos[7], S. Kaufmann[1], M. Kowalska[8,§], V. Lagaki[8,9], S. Lechner[8,10], B. Maaß[1], S. Malbrunot-Ettenauer[8], W. Nazarewicz[11], R. Neugart[12,5], G. Neyens[7], W. Nörtershäuser[1,‖], P.-G. Reinhard[13], S. Sailer[14], R. Sánchez[15], S. Schmidt[1], L. Wehner[12], C. Wraith[6], L. Xie[4], Z. Y. Xu[7], X. F. Yang[7,16], and D. T. Yordanov[2,¶]

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Phys. Rev. Lett. **122**, 212502 https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.122.212502

Proton Shell Evolution below ^{132}Sn: First Measurement of Low-Lying β-Emitting Isomers in ^{123,125}Ag

Z. Q. Chen[1], Z. H. Li[1,*], H. Hua[1,†], H. Watanabe[2,3], C. X. Yuan[4], S. Q. Zhang[1], G. Lorusso[3,5,6], S. Nishimura[3], H. Baba[3], F. Browne[3,7], G. Benzoni[8], K. Y. Chae[9], F. C. L. Crespi[8,10], P. Doornenbal[3], N. Fukuda[3], G. Gey[3,11,12], R. Gernhäuser[13], N. Inabe[3], T. Isobe[3], D. X. Jiang[1], A. Jungclaus[14], H. S. Jung[15,16], Y. Jin[1], D. Kameda[3], G. D. Kim[17], Y. K. Kim[17,18], I. Kojouharov[19], F. G. Kondev[20], T. Kubo[3], N. Kurz[19], Y. K. Kwon[17], X. Q. Li[1], J. L. Lou[1], G. J. Lane[21], C. G. Li[1], D. W. Luo[1], A. Montaner-Pizá[22], K. Moschner[23], C. Y. Niu[1], F. Naqvi[24], M. Niikura[25], H. Nishibata[26], A. Odahara[26], R. Orlandi[27,28], Z. Patel[6], Zs. Podolyák[6], T. Sumikama[3], P.-A. Söderström[3], H. Sakurai[3], H. Schaffner[19], G. S. Simpson[11], K. Steiger[13], H. Suzuki[3], J. Taprogge[3,14,29], H. Takeda[3], Zs. Vajta[3,30], H. K. Wang[31], J. Wu[1,20], A. Wendt[23], C. G. Wang[1], H. Y. Wu[1], X. Wang[1], C. G. Wu[1], C. Xu[1], Z. Y. Xu[25,32], A. Yagi[26], Y. L. Ye[1], and K. Yoshinaga[33]

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https://www.sciencedirect.com/science/article/pii/S0168900219301962

NEDA—NEutron Detector Array

J.J.Valiente-Dobón[a], G.Jaworski[a], A.Goasduff[abc], F.J.Egea[abcd], V.Modamio[ae], T.Hüyük[d], A.Triossi[bcf], M.Jastrząb[g], P.A.Söderström[h], A.Di Nitto[i], G.de Angelis[a], G.de France[j], N.Erduran[k], A.Gadea[d], M.Moszyński[l], J.Nyberg[m], M.Palacz[n], R.Wadsworth[o], R.Aliaga[d], C.Aufranc[q], M.Bézard[j], G.Baulieu[q], E.Bissiato[a], A.Boujrad[j], I.Burrows[p], S.Carturan[ab], P.Cocconi[a], G.Colucci[bc], D.Conventi[a], M.Cordwell[p], S.Coudert[j], J.M.Deltoro[a], L.Ducroux[j], T.Dupasquier[q], S.Ertürk[r], X.Fabian[q], V.González[s], A.Grant[p], K.Hadyńska-Klęk[at], A.Illana[a], M.L.Jurado-Gomez[d], M.Kogimtzis[p], I.Lazarus[p], L.Legeard[j], J.Ljungvall[u], G.Pasqualato[bc], R.M.Pérez-Vidal[d], A.Raggio[a], D.Ralet[j], N.Redon[q], F.Saillant[j], B.Sayğı[v], E.Sanchis[s], M.Scarcioffolo[bc], M.Siciliano[a], D.Testov[bc], O.Stezowski[q], M.Tripon[j] and I.Zanon[a]

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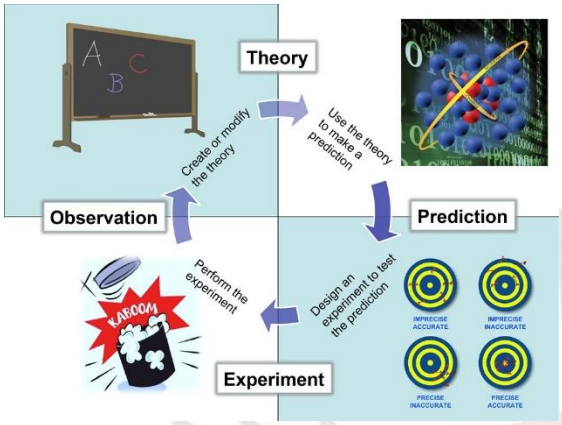
Edited by James Benstead, IOP Nuclear Physics Group Committee
james.benstead@awe.co.uk or j.benstead@surrey.ac.uk

2. News to Report

a. Upcoming Nuclear Physics Symposium "Challenges in theory of heavy nuclei"



This Symposium will celebrate the Honorary Degree that the University of York will confer on Witek Nazarewicz. The award ceremony will take place on 17 July 2019 at 10am, and the Symposium will thus start with a lunch on that day and finish with a lunch on 20 July. The location of the symposium will be King's Manor, York.

There will be a registration fee for the Symposium of 120 GBP, which will cover four lunches, morning and afternoon coffee breaks, and the Symposium dinner on Friday night. For credit card payments, please use the University of York online shop. No on-site cash payments or bank transfers are available.

Please register for the Symposium here. More info can be found on the Symposium web page.

Contribution by Jacek Dobaczewski (University of York)
jacek.dobaczewski@york.ac.uk

b. ND2019: International Conference on Nuclear Data for Science and Technology held in Beijing, China

A number of UK-based nuclear researchers attended the ND2019 conference held 19-24 May 2019 in Beijing, China. This conference, held every three years, is the largest in the field of Nuclear Data and attracts around 500 attendees from around the world.

In addition to representation from The University of Manchester, UKAEA, Isis, Wood, and AWE, a number of UK researchers based at overseas institutions were also present.

Tobias Wright (University of Manchester) presenting.

Tim Ware (Wood) presenting, with Mark Gilbert (UKAEA) chairing.

The next edition of this conference will be held in 2022 in Oakland, California.

Contribution by James Benstead (AWE)
james.benstead@awe.co.uk

3. Outreach Activity

Exotic Nuclei: On the Edge of Existence

On 15th May, Marina Petri (University of York) delivered a public talk at the IOP Headquarters on the topic of Exotic Nuclei.

The talk was well received by around 100 attendees.

Contribution by Marina Petri (University of York)

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4. Media Interactions

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