

**Progress Report**  
**NRDC-2022 Technical Meeting**  
(14-17 June, 2022, Vienna)

**Institute for Nuclear Research, ATOMKI**  
(S. Takács)

### **Nuclear Data Activities at ATOMKI in 2021-2022**

The usual experimental work was affected by COVID-19 situation and change / upgrade of infrastructure at atomki.

#### **1. Staff**

The organizational structure of the institute had changed from laboratory level to group level.

The following groups may publish EXFOR related experimental data:

Nuclear reaction data group: Overall staff number: 10.5 persons. Staff reduced by 1 physicist. One PhD student joined to the group.

The main task is to measure reaction cross sections of charged particle induced nuclear reactions.

Evaluation of nuclear reaction data

Applications:        medical applications  
                         thin layer activation and  
                         activation analysis

Nuclear astrophysics group: Overall staff number: 10 persons, 7 permanent staff member and 3 PhD students.

The main task is to measure charged particle induced reaction data at low energies relevant for various astrophysical processes.

Nuclear spectroscopy data group: Overall staff number: 11 persons, 8 permanent staff member and 3 PhD students.

The main task is to determine experimental nuclear structure and decay data of exotic nuclei using radioactive beams, study of exotic shapes of nuclei, excitation modes and decay of nuclei.

#### **2. EXFOR compilation**

7 new entries were compiled during the period 2021 and 9 new entries in 2022.

The compiled entries covered all the newly published articles for the covered period associated with atomki.

### 3. IAEA related activity:

- EXFOR: Compilation of all newly measured and published experimental data.
- TC: Evaluation of cross sections for medical isotope production and charged particle beam monitoring.
- CRP: Imaging Technologies for Process Investigations and Components Testing: Radioactive tracing of industrial processes by using Thin Layer Activation (TLA) and Positron Emission Tomography.

### 4. Publications in 2021 - 2022:

Nuclear reaction data group at ATOMKI

#### **Production cross sections of $^{47}\text{Sc}$ via alpha-particle-induced reactions on natural calcium up to 29 MeV**

Aikawa, Masayuki ; Hanada, Yukina ; Ichinkhorloo, Dagvadorj ; Haba, Hiromitsu ; Takács, Sándor ; Ditrói, Ferenc ; Szűcs, Zoltán  
NIM/B 515 pp. 1-6. (2022)

#### **Cross sections for formation of Y, Sr and Rb radionuclides induced by proton irradiation of natSr up to 33.6 MeV**

Hermanne, A. ; Tárkányi, F. ; Takács, S. ; Ditrói, F.  
NIM/B 511 pp. 91-104. (2022)

#### **Upgrade of recommended nuclear cross section data base for production of therapeutic radionuclides**

Tárkányi, F. ; Hermanne, A. ; Ignatyuk, A. V. ; Takács, S. ; Capote, R.  
JRNC 331; 3 pp. 1163-1206. (2022)

#### **Therapeutic Radiopharmaceuticals Labelled with Copper-67, Rhenium-186 and Scandium-47**

Aboudzadeh-Rovais, M. ; Alliot, C. ; Al Rayyes, A. ; Bilewicz, A. ; Chakraborty, S. ; Gagnon, K. ; Gizawy, M. ; Jalilian, A. ; Khandaker, M.U. ; Lapi, S.E. et al.  
Wien, Austria : International Atomic Energy Agency (IAEA) (2021)  
ISBN: 9789201350213

#### **Alternative Radionuclide production with a cyclotron**

Alves, F. ; Comor, J. ; Gagnon, K. ; Haji Saied, M. ; Jalilian, A. ; Lapi, S. ; Schlyer, D.J. ; Takács, S.  
Vienna, Austria : International Atomic Energy Agency (IAEA) (2021) , 69 p.  
ISBN: 9789201030214

**Excitation functions for Rh, Ru and Tc radionuclides obtained by proton irradiation of <sup>nat</sup>Ru up to 33.6 MeV**

Hermanne, A. ; Tárkányi, F. ; Takács, S.  
NIM/B 502 pp. 205-218. (2021)

**Upgrade of IAEA recommended data of selected nuclear reactions for production of PET and SPECT isotopes**

Hermanne, A. ; Tárkányi, F.T. ; Ignatyuk, A.V. ; Takács, S. ; Capote, R. ✉  
NDS 173 pp. 285-308. (2021)

**IAEA activities on <sup>67</sup>Cu, <sup>186</sup>Re, <sup>47</sup>Sc Theranostic radionuclides and Radiopharmaceuticals**

Jalilian, Amir R ; Gizawy, Mohamed A. ; Alliot, Cyrille ; Takacs, Sandor ; Chakarborty, Sudipta ; Rovais, Mohammad Reza Aboudzadeh ; Pupillo, Gaia ; Nagatsu, Kotaro ; Park, Jeong Hoon ; Khandaker, Mayeen Uddin et al.  
Current Radiopharmaceuticals 14 : 4 pp. 306-314. (2021)

**Measurement of production cross sections of <sup>175</sup>Hf in the natLu(p,x) and natLu(d,x) reactions**

Komori, Y. ; Haba, H. ; Aikawa, M. ; Saito, M. ; Takács, S. ; Ditrói, F.  
RIKAGAKU KENKYUJO ACCELERATOR PROGRESS REPORT 54 p. 171 (2021)

**Production cross section of medical radioisotope <sup>153</sup>Sm in alpha-particle-induced reaction on natural neodymium**

M., Sakaguchi ; M., Aikawa ; N., Ukon ; Y., Komori ; H., Haba ; N., Otuka ; S., Takacs  
RIKAGAKU KENKYUJO ACCELERATOR PROGRESS REPORT 54 p. 168 (2021)

**Activation cross section measurement of alpha-particle induced reactions on natural neodymium**

Sakaguchi, Michiya ; Aikawa, Masayuki ; Ukon, Naoyuki ; Komori, Yukiko ; Haba, Hiromitsu ; Otuka, Naohiko ; Takács, Sándor  
JARI 176 Paper: 109826 (2021)

**Cross sections of alpha-particle-induced reactions on natNi: Production of <sup>67</sup>Cu**

Takács, S. ; Aikawa, M. ; Haba, H. ; Komori, Y. ; Ditrói, F. ; Szűcs, Z. ; Saito, M. ; Murata, T. ; Sakaguchi, M. ; Ukon, N.  
RIKAGAKU KENKYUJO ACCELERATOR PROGRESS REPORT 54 p. 164 (2021)

**Cross section measurement of alpha-particle-induced reactions on <sup>nat</sup>Sb**

Takács, S. ✉ ; Ditrói, F. ; Szűcs, Z. ; Brezovcsik, K. ; Haba, H. ; Komori, Y. ; Aikawa, M. ; Saito, M. ; Murata, T. ; Sakaguchi, M. et al.  
NIM/B 505 pp. 24-33. (2021)

**Activation cross sections of gamma-emitters produced in deuteron induced reactions on <sup>209</sup>Bi up to 50 MeV**

Tárkányi, F. ; Takács, S. ; Ditrói, F. ; Szűcs, Z. ; Brezovcsik, K. ; Hermanne, A. ; Ignatyuk, A. V.

EPJ/A 57 : 7 Paper: 233 (2021)

**Investigation of activation cross-sections of deuteron induced reactions on ruthenium up to 50 MeV**

Tárkányi, F. ; Ditrói, F. ; Takács, S. ; Hermanne, A. ; Ignatyuk, A.V. ; Spahn, I. ; Spellerberg, S.  
JARI 168 Paper: 109401 (2021)

**Investigation of cross sections of deuteron induced nuclear reactions on selenium up to 50 MeV**

Tárkányi, Ferenc ; Takács, Sándor ; Ditrói, Ferenc ; Szűcs, Zoltán ; Brezovcsik, Károly ;  
Hermanne, Alex ; Ignatyuk, Anatolij V.  
EPJ/A: 4 p. 117 (2021)

**Activation cross section data of deuteron induced nuclear reactions on rubidium up to 50 MeV**

Tárkányi, Ferenc ; Hermanne, Alex ; Ditrói, Ferenc ; Takács, Sándor ; Ignatyuk, Anatolij V. ;  
Spahn, Ingo ; Spellerberg, Stephan  
EPJ/A 57 : 1 Paper: 21 (2021)

**Production cross sections of  $^{45}\text{Ti}$  in the deuteron-induced reaction on  $^{45}\text{Sc}$  up to 24 MeV**

Tsoodol, Zolbadral ✉ ; Aikawa, Masayuki ; Ichinkhorloo, Dagvadorj ; Khishigjargal,  
Tegshjargal ; Norov, Erdene ; Komori, Yukiko ; Haba, Hiromitsu ; Takács, Sándor ; Ditrói,  
Ferenc ; Szűcs, Zoltán  
JARI 168 Paper: 109448 (2021)

**Evaluation of Wear Measurement with Radioactive Isotopes for DLC Coatings Affected by Abrasive Particles**

Zellhofer, Manuel ; Jech, Martin ; Badisch, Ewald ; Ditrói, Ferenc ; Kübler, Andreas ;  
Mayrhofer, Paul Heinz  
TRIBOLOGY LETTERS 70 : 2 Paper: 55 (2022)

**Deuteron induced nuclear reactions on Mo up to 10 MeV: experimental investigation and nuclear model calculations**

Elbinawi, A. ; Ali, B. M. ; Mohamed, Gehan Y. ; Ditrói, F. ; Al-abyad, M.  
EPJ/A 57 : 11 p. 312 (2021)

**Compound-Specific Imaging of Methanol Fuel Cell for Performance and Degradation Studies Using a Mini Positron Emission Tomograph**

Sarkadi-Priboczki, Eva ; Varga, Mate ; Valastyan, Ivan ; Brezovcsik, Karoly ; Fenyvesi, Andras ;  
Molnar, Jozsef  
Chemistry–Methods 1 : 7 pp. 315-322. , 8 p. (2021)

Pairing of thorium with selected primary target materials in tandem configurations: Co-production of  $^{225}\text{Ac}/^{213}\text{Bi}$  and  $^{230}\text{U}/^{226}\text{Th}$  generators with a 70 MeV H<sup>-</sup> cyclotron  
Steyn, G.F.; Motetshwane, M.A. ; Szelecsényi, F. ; Brümmer, J.W.

JARI 168 Paper: 109514 (2021)

**Large-scale production of  $^{88}\text{Y}$  and  $^{88}\text{Zr}/^{88}\text{Y}$  generators: A proof of concept study for a 70 MeV H – cyclotron**

Steyn, G.F. ; van der Walt, T.N. ; Szelecsényi, F. ; Perrang, C. ; Brümmer, J.W. ; Vermeulen, C. ; van der Meulen, N.P. ; Motetshwane, M.A. ; van Heerden, M.R.

JARI 168 Paper: 109469 (2021)

Nuclear Astrophysics Group at ATOMKI

**Determination of the  $^7\text{Be}(p,\gamma)^8\text{B}$  cross section at astrophysical energies using a radioactive  $^7\text{Be}$  ion beam**

Buompane, R. ; Di Leva, A. ; Gialanella, L. ; D'Onofrio, A. ; De Cesare, M. ; Duarte, J.G. ; Fülöp, Z. ; Gasques, L.R. ; Gyürky, Gy. ; Morales-Gallegos, L. et al.

PHYSICS LETTERS B 824 Paper: 136819 (2022)

**Study of the  $^{20}\text{Ne}(p,\gamma)^{21}\text{Na}$  reaction at LUNA**

Cacioli, Antonio ; Zavatarelli, Sandra ; Fülöp, Zsolt ; Gyürky, György ; Elekes, Zoltán ; Csedreki, László ; Szücs, Tamás ; LUNA, COLL

EPJ WEB OF CONFERENCES 260 p. 11007 (2022)

**Probing the early Universe from deep underground**

Cavanna, Francesca ; Fülöp, Zsolt ; Gyürky, György ; Elekes, Zoltán ; Csedreki, László ; Szücs, Tamás ; LUNA, COLL

EPJ WEB OF CONFERENCES 260 p. 08005 (2022)

**Final results on the  $^{13}\text{C}(\alpha,n)^{16}\text{O}$  cross section at low energies at LUNA**

Ciani, Giovanni Francesco ; Csedreki, Laszlo ; Rapagnani, David ; Best, Andreas ; Formicola, Alba ; Fülöp, Zsolt ; Gyürky, György ; Elekes, Zoltán ; Szücs, Tamás ; LUNA, COLL

EPJ WEB OF CONFERENCES 260 p. 08003 (2022)

**The challenging direct measurement of the 65 keV resonance strength of the  $^{17}\text{O}(p,\gamma)^{18}\text{F}$  reaction at LUNA**

Ciani, Giovanni Francesco ; Piatti, Denise ; Gesuè, Riccardo Maria ; Fülöp, Zsolt ; Gyürky, György ; Elekes, Zoltán ; Csedreki, László ; Szücs, Tamás ; LUNA, COLL

EPJ WEB OF CONFERENCES 260 p. 11003 (2022)

**Activation cross section measurement of the  $^{14}\text{N}(p,\gamma)^{15}\text{O}$  astrophysical key reaction**

Gyürky, Gy. ; Halász, Z. ; Kiss, G. G. ; Szücs, T. ; Fülöp, Zs.

PHYSICAL REVIEW C 105 : 2 Paper: L022801 (2022)

### **Challenges and Requirements in High-Precision Nuclear Astrophysics Experiments**

Gyürky, György

UNIVERSE 8 : 4 Paper: 216 (2022)

### **First direct limit on the 395 keV resonance of the $^{22}\text{Ne}(\alpha,\gamma)^{26}\text{Mg}$ reaction**

Masha, Eliana ; Fülöp, Zsolt ; Gyürky, György ; Elekes, Zoltán ; Csedreki, László ; Szücs, Tamás ; LUNA, COLL

EPJ WEB OF CONFERENCES 260 p. 11017 (2022)

### **Underground measurement at LUNA found no evidence for a low-energy resonance in the $^6\text{Li}(\text{p},\gamma)^7\text{Be}$ reaction**

Piatti, Denise ; Fülöp, Zsolt ; Gyürky, György ; Elekes, Zoltán ; Csedreki, László ; Szücs, Tamás ; LUNA, COLL

EPJ WEB OF CONFERENCES 260 p. 11027 (2022)

### **Measurement and analysis techniques for a study of $^{12}\text{C}(\text{p},\gamma)$ and $^{13}\text{C}(\text{p},\gamma)$ deep underground**

Skowronski, Jakub ; Fülöp, Zsolt ; Gyürky, György ; Elekes, Zoltán ; Csedreki, László ; Szücs, Tamás ; LUNA, COLL

EPJ WEB OF CONFERENCES 260 p. 11008 (2022)

### **Astrophysics, astrochemistry and laboratory space research with particle accelerators**

Biri, S ; Rácz, R ; Gyürky, Gy ; Fülöp, Zs ; Juhász, Z ; Sulik, B ; Mifsud, D

Giants - Gruppi Italiani di Astrofisica Nucleare Teorica e Sperimentale 2021 : 13 pp. 9-12. , 4 p. (2021)

### **Direct Measurement of the $^{13}\text{C}(\alpha,\text{n})^{16}\text{O}$ Cross Section into the s -Process Gamow Peak**

Ciani, G. F. ; Csedreki, L. ; Rapagnani, D. ; Aliotta, M. ; Balibrea-Correa, J. ; Barile, F. ; Bemmerer, D. ; Best, A. ; Boeltzig, A. ; Broggini, C. et al.

PHYSICAL REVIEW LETTERS 127 : 15 Paper: 152701 , 7 p. (2021)

### **Characterization of the LUNA neutron detector array for the measurement of the $^{13}\text{C}(\alpha,\text{n})^{16}\text{O}$ reaction**

Csedreki, L. ; Ciani, G.F. ; Balibrea-Correa, J. ; Best, A. ; Aliotta, M. ; Barile, F. ; Bemmerer, D. ; Boeltzig, A. ; Broggini, C. ; Bruno, C.G. et al.

NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT 994 Paper: 165081 , 8 p. (2021)

### **Measurement of the $^{91}\text{Zr}(\text{p},\gamma)^{92\text{m}}\text{Nb}$ cross section motivated by type Ia supernova nucleosynthesis**

Gyürky, Gy ; Halász, Z ; Kiss, G G ; Szücs, T ; Huszánk, R ; Török, Zs ; Fülöp, Zs ; Rauscher, T ; Travaglio, C

JOURNAL OF PHYSICS G-NUCLEAR AND PARTICLE PHYSICS 48 : 10 Paper: 105202 , 11 p. (2021)

**Low-energy Measurement of the  $^{96}\text{Zr}(\alpha,n)^{99}\text{Mo}$  Reaction Cross Section and Its Impact on Weak r -process Nucleosynthesis**

Kiss, G. G. ; Szegedi, T. N. ; Mohr, P. ; Jacobi, M. ; Gyürky, Gy. ; Huszánk, R. ; Arcones, A.  
ASTROPHYSICAL JOURNAL 908 : 2 Paper: 202 , 7 p. (2021)

**Indirect determination of the astrophysical factor for the ( reaction using the asymptotic normalization coefficient method**

Kiss, G.G. ; La, Cognata M. ; Yarmukhamedov, R. ; Tursunmakhatov, K.I. ; Wiedenhöver, I. ; Baby, L.T. ; Cherubini, S. ; Cvetinović, A. ; D'Agata, G. ; Figuera, P. et al.  
PHYSICAL REVIEW C 104 : 1 Paper: 015807 , 12 p. (2021)

**First direct measurement of 395 keV resonance of the  $^{22}\text{Ne}(\alpha,\gamma)^{26}\text{Mg}$  reaction at LUNA**

Masha, E. ; Imbriani, G. ; Compagnucci, A. ; Junker, M. ; Barile, F. ; Ciani, G.F. ; Patocchio, V. ; Schiavulli, L. ; Lugaro, M. ; Csedreki, L. et al.  
NUOVO CIMENTO C-COLLOQUIA AND COMMUNICATIONS IN PHYSICS 44 Paper: 57 (2021)

**Astrophysical reaction rates of  $\alpha$ -induced reactions for nuclei with  $26 \leq Z \leq 83$  from the new Atomki-V2  $\alpha$ -nucleus potential**

Mohr, P. ; Fülöp, Z. ; Gyürky, G. ; Kiss, G.G. ; Szücs, T. ; Arcones, A. ; Jacobi, M. ; Psaltis, A.  
ATOMIC DATA AND NUCLEAR DATA TABLES 142 Paper: 101453 , 19 p. (2021)

**Low-energy resonances in the  $^{18}\text{O}(\text{p},\gamma)^{19}\text{F}$  reaction**

Pantaleo, F. R. ; Boeltzig, A. ; Best, A. ; Perrino, R. ; Aliotta, M. ; Balibrea-Correa, J. ; Barile, F. ; Bemmerer, D. ; Broggini, C. ; Bruno, C. G. et al.  
PHYSICAL REVIEW C 104 : 2 Paper: 025802 (2021)

**Activation thick target yield measurement of  $^{100}\text{Mo}(\alpha,n)^{103}\text{Ru}$  for studying the weak r-process nucleosynthesis**

Szegedi, TN ; Kiss, GG ; Mohr, P ; Psaltis, A ; Jacobi, M ; Barnafoldi, GG ; Szucs, T ; Gyurky, G ; Arcones, A  
PHYSICAL REVIEW C 104 : 3 Paper: 035804 , 7 p. (2021)

Nuclear Spectroscopy Data Group at ATOMKI

**Evidence against the wobbling nature of low-spin bands in  $^{135}\text{Pr}$**

Lv, B. F. ; Petrache, C. M. ; Lawrie, E. A. ; Guo, S. ; Astier, A. ; Dupont, E. ; Zheng, K. K. ; Ong, H. J. ; Wang, J. G. ; Zhou, X. H. et al.  
PHYSICS LETTERS B 824 p. 136840 (2022)

**Experimental evidence for transverse wobbling bands in  $^{136}\text{Nd}$**

Lv, B.F. ; Petrache, C.M. ✉ ; Budaca, R. ; Astier, A. ; Zheng, K.K. ; Greenlees, P. ; Badran, H. ; Calverley, T. ; Cox, D.M. ; Grahn, T. et al.  
PHYSICAL REVIEW C 105 : 3 Paper: 034302 (2022)

### **Candidate revolving chiral doublet bands in $^{119}\text{Cs}$**

Zheng, K.K. ; Petrache, C.M. ✉ ; Zhang, Z.H. ; Astier, A. ; Lv, B.F. ; Greenlees, P.T. ; Grahn, T. ; Julin, R. ; Juutinen, S. ; Luoma, M. et al.  
EUROPEAN PHYSICAL JOURNAL A: HADRONS AND NUCLEI 58 : 3 Paper: 50 (2022)

### **Highly deformed band structures due to core excitations in $^{123}\text{Xe}$**

Basu, A. ; Singh, A.K. ; Ragnarsson, I. ; Carlsson, B.G. ; Kardan, A. ; Hagemann, G.B. ; Sletten, G. ; Herskind, B. ; Hübel, H. ; Chmel, S. et al.  
PHYSICAL REVIEW C 103 : 1 Paper: 014301 (2021)

### **New anomaly observed in $^4\text{He}$ supports the existence of the hypothetical X17 particle**

Krasznahorkay, A. J. ✉ ; Csatlós, M. ; Csige, L. ; Gulyás, J. ; Krasznahorkay, A. ; Nyakó, B. M. ; Rajta, I. ; Timár, J. ; Vajda, I. ; Sas, N. J.  
PHYSICAL REVIEW C 104 : 4 Paper: 044003 (2021)

### **Evidence for enhanced neutron-proton correlations from the level structure of the $N=Z+1$ nucleus $\text{Tc}44\ 4387$**

Liu, X. ✉ ; Cederwall, B. ; Qi, C. ; Wyss, R.A. ; Aktas, Ö. ; Ertoprak, A. ; Zhang, W. ; Clément, E. ; De, France G. ; Ralet, D. et al.  
PHYSICAL REVIEW C 104 : 2 Paper: L021302 (2021)

### **Tilted precession bands in $^{135}\text{Nd}$**

Lv, B.F. ; Petrache, C.M. Petrache@ijclab.in2p3.fr ; Lawrie, E.A. ; Astier, A. ; Dupont, E. ; Zheng, K.K. ; Greenlees, P. ; Badran, H. ; Calverley, T. ; Cox, D.M. et al.  
PHYSICAL REVIEW C 103 : 4 Paper: 044308 (2021)

### **Medium-spin states of the neutron-rich nucleus $^{87}\text{Br}$**

Nyakó, B. M. ; Timár, J. ; Csatlós, M. ; Dombrádi, Zs. ; Krasznahorkay, A. ; Kuti, I. ; Sohler, D. ; Tornyi, T. G. ; Czerwiński, M. ; Rząca-Urban, T. et al.  
PHYSICAL REVIEW C 103 : 3 Paper: 034304 (2021)

### **Observation of excited states in the neutron-rich nucleus $^{89}\text{Br}$**

Nyakó, B.M. ; Timár, J. ; Csatlós, M. ; Dombrádi, Z. ; Krasznahorkay, A.J. ; Kuti, I. ; Sohler, D. ; Tornyi, T.G. ; Czerwiński, M. ; Rząca-Urban, T. et al.  
PHYSICAL REVIEW C 104 : 5 Paper: 054305 (2021)

### **Complete set of proton excitations in $^{119}\text{Cs}$**

Zheng, K. K. ; Petrache, C. M. ; Zhang, Z. H. ; Astier, A. ; Lv, B. F. ; Greenlees, P. T. ; Grahn, T. ; Julin, R. ; Juutinen, S. ; Luoma, M. et al.  
PHYSICAL REVIEW C 104 : 4 Paper: 044305 (2021)



**Rich band structure and multiple long-lived isomers in the odd-odd nucleus**

Zheng, K.K. ; Petrache, C.M. ; Zhang, Z.H. ; Astier, A. ; Lv, B.F. ; Greenlees, P.T. ; Grahn, T. ; Julin, R. ; Juutinen, S. ; Luoma, M. et al.

PHYSICAL REVIEW C 104 : 4 Paper: 044325 (2021)

**Evidence of oblate-prolate shape coexistence in the strongly-deformed nucleus  $^{119}\text{Cs}$**

Zheng, K.K. ; Petrache, C.M. ; Zhang, Z.H. ; Zhao, P.W. ; Wang, Y.K. ; Astier, A. ; Lv, B.F. ; Greenlees, P.T. ; Grahn, T. ; Julin, R. et al.

PHYSICS LETTERS B 822 Paper: 136645 (2021)

**Neutron excitations in  $^{119}\text{Ba}$**

Zheng, K.K. ; Petrache, C.M. ; Zhang, Z.H. ; Astier, A. ; Lv, B.F. ; Greenlees, P.T. ; Grahn, T. ; Julin, R. ; Juutinen, S. ; Luoma, M. et al.

PHYSICAL REVIEW C 104 : 1 Paper: 014326 (2021)

**Fission resonances observed in the  $^{237}\text{Np}(d,pf)$  reaction and the fission barrier topology of  $^{238}\text{Np}$**

Csige, L. ; Csatlós, M. ; Faestermann, T. ; Habs, D. ; Hunyadi, M. ; Krasznahorkay, A.J. ; Thierolf, P.G. ; Tornyi, T.G. ; Wirth, H.-F.

EUROPEAN PHYSICAL JOURNAL A: HADRONS AND NUCLEI 58 : 2 Paper: 14 (2022)

DOI WoS Scopus

Tudományos

**$\gamma$  decay to the ground state from the excitations above the neutron threshold in the  $^{208}\text{Pb}(p,p'\gamma)$  reaction at 85 MeV**

Wasilewska, B. ; Kmiecik, M. ; Ciemała, M. ; Maj, A. ; Crespi, F.C.L. ; Bracco, A. ; Harakeh, M.N. ; Bednarczyk, P. ; Bottoni, S. ; Brambilla, S. et al.

PHYSICAL REVIEW C 105 : 1 Paper: 014310 (2022)

**New narrow resonances observed in the unbound nucleus  $^{15}\text{F}$**

Girard-Alcindor, V. ; Mercenne, A. ; Stefan, I. ; De, Oliveira Santos F. ; Michel, N. ; Płoszajczak, M. ; Assié, M. ; Lemasson, A. ; Clément, E. ; Flavigny, F. et al.

PHYSICAL REVIEW C 105 : 5 Paper: L051301 (2022)

**Border of the island of inversion: Unbound states in  $^{29}\text{Ne}$**

Holl, M. ; Lindberg, S. ; Heinz, A. ; Kondo, Y. ; Nakamura, T. ; Tostevin, J. A. ; Wang, H. ; Nilsson, T. ; Achouri, N. L. ; Al Falou, H. et al.

PHYSICAL REVIEW C 105 : 3 Paper: 034301 (2022)

**A first glimpse at the shell structure beyond  $^{54}\text{Ca}$ : Spectroscopy of  $^{55}\text{K}$ ,  $^{55}\text{Ca}$ , and  $^{57}\text{Ca}$**

Koiwai, T. ; Wimmer, K. ✉ ; Doornenbal, P. ; Obertelli, A. ; Barbieri, C. ; Duguet, T. ; Holt, J.D. ; Miyagi, T. ; Navrátil, P. ; Ogata, K. et al.

PHYSICS LETTERS B 827 Paper: 136953 (2022)

**Pairing Forces Govern Population of Doubly Magic  $^{54}\text{Ca}$  from Direct Reactions**

Browne, F. ✉ ; Chen, S. ; Doornenbal, P. ; Obertelli, A. ; Ogata, K. ; Utsuno, Y. ; Yoshida, K. ; Achouri, N.L. ; Baba, H. ; Calvet, D. et al.  
PHYSICAL REVIEW LETTERS 126 : 25 Paper: 252501 (2021)

**Coulomb and nuclear excitations of and at intermediate energy**

Calinescu, S. ; Sorlin, O. ; Matea, I. ; Carstoiu, F. ; Dao, D.D. ; Nowacki, F. ; de, Angelis G. ; Astabatyán, R. ; Bagchi, S. ; Borcea, C. et al.  
PHYSICAL REVIEW C 104 : 3 Paper: 034318 (2021)

**Signature splitting of the  $g_{7/2} [404] 7/2 +$  bands in  $^{131}\text{Ba}$  and  $^{133}\text{Ce}$**

Ding, B. ; Petrache, C. M. ; Guo, S. ; Lawrie, E. A. ; Wakudyanaye, I. ; Zhang, Z. H. ; Wang, H. L. ; Meng, H. Y. ; Mengoni, D. ; Qiang, Y. H. et al.  
PHYSICAL REVIEW C 104 : 6 Paper: 064304 (2021)

**Persistence of the  $Z=28$  shell gap in  $A=75$  isobars: Identification of a possible  $(1/2^-) \mu s$  isomer in  $\text{Co } 75$  and  $\beta$  decay to  $\text{Ni } 75$**

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