

# Jin Lei, Ph.D.

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## Employment History

- 2020.II – Now    ■ **Research Fellow** Tongji University
- 2019.II – 2020.I0    ■ **Post-Doctoral Research Associate** INFN, Sezione di Pisa  
Supervisor: Dr. Angela Bonaccorso
- 2016.8 – 2019.8    ■ **Post-Doctoral Research Associate** Department of Physics and Astronomy,  
Ohio University  
Supervisor: Prof. Charlotte Elster

## Education

- 2013.I0 – 2016.7    ■ **Ph.D., University of Seville, Spain** in Theoretical Nuclear Physics.  
Supervisor: Prof. Antonio M. Moro  
Thesis title: *Study of Inclusive Breakup Reactions Induced by Weakly Bound Nuclei*.  
More details at <https://idus.us.es/xmlui/handle/11441/44344>
- 2010.9 – 2013.7    ■ **M.Sc., University of Chinese Academic of Sciences, China** in Nuclear  
Physics  
Supervisor: Prof. Jiansong Wang  
Thesis title: *Reduction Method for Low-energy Nuclear Reaction Systems*.
- 2006.9 – 2010.7    ■ **B.Eng., Northeastern University, China.** in Mechanical Engineering

## Skills

- Languages    ■ Native speaker of Chinese; strong reading, writing and speaking competencies in English.
- Coding    ■ C/C++, Fortran, L<sup>A</sup>T<sub>E</sub>X

## Research Publications

### Journal Articles

- 1    Jin Lei and Angela Bonaccorso, ‘Comparison of semiclassical transfer to continuum model with ichimura-austern-vincent model in medium energy knockout reactions’, *Physics Letters B* **813**, 136032 (2021).
- 2    Calvin W Johnson, Kristina D Launey, Naftali Auerbach, Sonia Bacca, Bruce R Barrett, Carl R Brune, Mark A Caprio, Pierre Descouvemont, W H Dickhoff, Charlotte Elster, Patrick J Fasano, Kevin Fosse, Heiko Hergert, Morten Hjorth-Jensen, Linda Hlophe, Baishan Hu, Rodolfo M Id Betan, Andrea Idini, Sebastian König, Konstantinos Kravvaris, Dean Lee, **Jin Lei**, Alexis Mercenne, Rodrigo Navarro Perez, Witold Nazarewicz, Filomena M Nunes, Marek Płoszajczak, Jimmy Rotureau, Gautam Rupak, Andrey M Shirokov,

- Ian Thompson, James P Vary, Alexander Volya, Furong Xu, Remco G T. Zegers, Vladimir Zelevinsky and Xilin Zhang, ‘White paper: from bound states to the continuum’, *Journal of Physics G: Nuclear and Particle Physics* **47**, 123001 (2020).
- 3 **Jin Lei** and Pierre Descouvemont, ‘Lagrange-mesh  $r$ -matrix method for inhomogeneous equations’, *Phys. Rev. C* **102**, 014608 (2020).
  - 4 F.F. Duan, Y.Y. Yang, K. Wang, A.M. Moro, V. Guimarães, D.Y. Pang, J.S. Wang, Z.Y. Sun, **Jin Lei**, A. Di Pietro, X. Liu, G. Yang, J.B. Ma, P. Ma, S.W. Xu, Z. Bai, X.X. Sun, Q. Hu, J.L. Lou, X.X. Xu, H.X. Li, S.Y. Jin, H.J. Ong, Q. Liu, J.S. Yao, H.K. Qi, C.J. Lin, H.M. Jia, N.R. Ma, L.J. Sun, D.X. Wang, Y.H. Zhang, X.H. Zhou, Z.G. Hu and H.S. Xu, ‘Scattering of the halo nucleus  $^{11}\text{Be}$  from a lead target at 3.5 times the coulomb barrier energy’, *Physics Letters B* **811**, 135942 (2020).
  - 5 J. P. Fernández-García, A. Di Pietro, P. Figuera, J. Gómez-Camacho, M. Lattuada, **Jin Lei**, A. M. Moro, M. Rodríguez-Gallardo and V. Scuderi, ‘Breakup mechanisms in the  $^6\text{He} + ^{64}\text{Zn}$  reaction at near-barrier energies’, *Phys. Rev. C* **99**, 054605 (2019).
  - 6 L. Hlophe, **Jin Lei**, Ch. Elster, A. Nogga, F. M. Nunes, D. Jurčiukonis and A. Deltuva, ‘Deuteron- $\alpha$  scattering: Separable versus nonseparable Faddeev approach’, *Phys. Rev. C* **100**, 034609 (2019).
  - 7 **Jin Lei** and Antonio M. Moro, ‘Puzzle of Complete Fusion Suppression in Weakly Bound Nuclei: A Trojan Horse Effect?’, *Phys. Rev. Lett.* **122**, 042503 (2019).
  - 8 **Jin Lei** and Antonio M. Moro, ‘Unraveling the Reaction Mechanisms Leading to Partial Fusion of Weakly Bound Nuclei’, *Phys. Rev. Lett.* **123**, 232501 (2019).
  - 9 Rodrigo Navarro Pérez and **Jin Lei**, ‘Is the unusual near-threshold potential behavior in elastic scattering of weakly-bound nuclei a precision error?’, *Physics Letters B* **795**, 200–205 (2019).
  - 10 A. Di Pietro, A.M. Moro, **Jin Lei** and R. de Diego, ‘Insights into the dynamics of breakup of the halo nucleus  $^{11}\text{Be}$  on a  $^{64}\text{Zn}$  target’, *Physics Letters B* **798**, 134954 (2019).
  - 11 **Jin Lei**, ‘Inclusive breakup calculations in angular momentum basis: Application to  $^7\text{Li} + ^{58}\text{Ni}$ ’, *Phys. Rev. C* **97**, 034628 (2018).
  - 12 **Jin Lei**, L. Hlophe, Ch. Elster, A. Nogga, F. M. Nunes and D. R. Phillips, ‘Few-body universality in the deuteron- $\alpha$  system’, *Phys. Rev. C* **98**, 051001(R) (2018).
  - 13 **Jin Lei** and Antonio M. Moro, ‘Post-prior equivalence for transfer reactions with complex potentials’, *Phys. Rev. C* **97**, 011601(R) (2018).
  - 14 L. Hlophe, **Jin Lei**, Ch. Elster, A. Nogga and F. M. Nunes, ‘ $^6\text{Li}$  in a three-body model with realistic Forces: Separable versus nonseparable approach’, *Phys. Rev. C* **96**, 064003 (2017).
  - 15 **Jin Lei** and Antonio M. Moro, ‘Comprehensive analysis of large  $\alpha$  yields observed in  $^6\text{Li}$ -induced reactions’, *Phys. Rev. C* **95**, 044605 (2017).
  - 16 G. Potel, G. Perdikakis, B. V. Carlson, M. C. Atkinson, W. H. Dickhoff, J. E. Escher, M. S. Hussein, **Jin Lei**, W. Li, A. O. Macchiavelli, A. M. Moro, F. M. Nunes, S. D. Pain and J. Rotureau, ‘Toward a complete theory for predicting inclusive deuteron breakup away from stability’, *The European Physical Journal A* **53**, 178 (2017).
  - 17 Q. Ducasse, B. Jurado, M. Aïche, P. Marini, L. Mathieu, A. Görgen, M. Guttormsen, A. C. Larsen, T. Tornyi, J. N. Wilson, G. Barreau, G. Boutoux, S. Czajkowski, F. Giaccoppo, F. Gunsing, T. W. Hagen, M. Lebois, **Jin Lei**, V. Méot, B. Morillon, A. M. Moro, T. Renstrøm, O. Roig, S. J. Rose, O. Sérot, S. Siem, I. Tsekhanovich, G. M. Tveten and M. Wiedeking,

- ‘Investigation of the  $^{238}\text{U}(d, p)$  surrogate reaction via the simultaneous measurement of  $\gamma$ -decay and fission probabilities’, *Phys. Rev. C* **94**, 024614 (2016).
- 18 **Jin Lei** and Antonio M. Moro, ‘Numerical assessment of post-prior equivalence for inclusive breakup reactions’, *Phys. Rev. C* **92**, 061602(R) (2015).
  - 19 **Jin Lei** and Antonio M. Moro, ‘Reexamining closed-form formulae for inclusive breakup: Application to deuteron- and  $^6\text{Li}$ -induced reactions’, *Phys. Rev. C* **92**, 044616 (2015).
  - 20 Y. Y. Yang, J. S. Wang, Q. Wang, D. Y. Pang, J. B. Ma, M. R. Huang, P. Ma, S. L. Jin, J. L. Han, Z. Bai, **Jin Lei**, J. B. Chen, Q. Hu, R. Wada, S. Mukherjee, Z. Y. Sun, R. F. Chen, X. Y. Zhang, Z. G. Hu, X. H. Yuan, S. W. Xu, S. Z. Chen, X. G. Lei, L. X. Liu, W. H. Ma, S. T. Wang, D. Yan, X. H. Zhang, M. H. Zhao, Y. Zhou, Y. J. Zhou, Z. Y. Guo, Y. H. Zhang, H. S. Xu and G. Q. Xiao, ‘Quasi-elastic scattering of  $^{10,11}\text{C}$  and  $^{10}\text{B}$  from a  $^{\text{nat}}\text{Pb}$  target’, *Phys. Rev. C* **90**, 014606 (2014).
  - 21 Y. Y. Yang, J. S. Wang, Q. Wang, D. Y. Pang, J. B. Ma, M. R. Huang, J. L. Han, P. Ma, S. L. Jin, Z. Bai, Q. Hu, **Jin Lei**, J. B. Chen, N. Keeley, K. Rusek, R. Wada, S. Mukherjee, Z. Y. Sun, R. F. Chen, X. Y. Zhang, Z. G. Hu, X. H. Yuan, X. G. Cao, Z. G. Xu, S. W. Xu, C. Zhen, Z. Q. Chen, Z. Chen, S. Z. Chen, C. M. Du, L. M. Duan, F. Fu, B. X. Gou, J. Hu, J. J. He, X. G. Lei, S. L. Li, Y. Li, Q. Y. Lin, L. X. Liu, F. D. Shi, S. W. Tang, G. Xu, X. Xu, L. Y. Zhang, X. H. Zhang, W. Zhang, M. H. Zhao, Z. Y. Guo, Y. H. Zhang, H. S. Xu and G. Q. Xiao, ‘Elastic scattering of the proton drip-line nucleus  $^8\text{B}$  off a  $^{\text{nat}}\text{Pb}$  target at 170.3 MeV’, *Phys. Rev. C* **87**, 044613 (2013).
  - 22 Y. Y. Yang, J. S. Wang, Q. Wang, J. B. Ma, M. R. Huang, J. L. Han, P. Ma, S. L. Jin, Z. Bai, Q. Hu, **Jin Lei**, J. B. Chen, R. Wada, Z. Y. Sun, R. F. Chen, X. Y. Zhang, Z. G. Hu, X. H. Yuan, X. G. Cao, Z. G. Xu, S. W. Xu, C. Zhen, Z. Q. Chen, Z. Chen, S. Z. Chen, C. M. Du, L. M. Duan, F. Fu, B. X. Gou, J. Hu, J. J. He, X. G. Lei, S. L. Li, Y. Li, Q. Y. Lin, L. X. Liu, F. D. Shi, S. W. Tang, G. Xu, X. Xu, L. Y. Zhang, X. H. Zhang, W. Zhang, M. H. Zhao, Y. H. Zhang and H. S. Xu, ‘A method for the measurement of elastic scattering angular distribution at HIRFL-RIBLL’, *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* **701**, 1–6 (2013).
  - 23 **Jin Lei**, J. S. Wang, S. Mukherjee, Q. Wang and R. Wada, ‘Phenomenological formula of total reaction cross sections for low-energy systems’, *Phys. Rev. C* **86**, 057603 (2012).
  - 24 **Jin Lei**, J. S. Wang, S. Mukherjee, Q. Wang, R. Wada, Y. Y. Yang, J. B. Chen, J. L. Han, M. R. Huang, Z. Bai, P. Ma, S. L. Jin, J. B. Ma, Y. Li and M. H. Zhao, ‘Quarter-point angle for light, weakly bound projectiles’, *Phys. Rev. C* **86**, 057602 (2012).

## Conference Proceedings

- 1 L. Hlophe, **Jin Lei**, Ch. Elster, A. Nogga and F. M. Nunes, ‘Three-body approach to deuteron-alpha scattering using realistic forces in a separable or non-separable representation’, *Recent Progress in Few-Body Physics*, edited by N. A. Orr, M. Płoszajczak, F. M. Marqués and J. Carbonell, 267–271 (2020).
- 2 F. M. Nunes, P. C. Capel, Ch. Elster, L. Hlophe, **Jin Lei**, Weichuan Li, A. E. Lovell, G. Potel, J. Rotureau and T. Poxon-Pearson, ‘New developments in reaction theory: preparing for the frib era’, *EPJ Web Conf.* **178**, 03001 (2018).
- 3 **Jin Lei** and Antonio M. Moro, ‘Evaluation of inclusive breakup cross sections in reactions induced by weakly-bound nuclei within a three-body model’, *EPJ Web of Conferences* **117**, 06016 (2016).
- 4 **Jin Lei** and Antonio M. Moro, ‘Evaluation of Inclusive Breakup in Reactions Induced by Deuteron within a Three-Body Model’, *Basic Concepts in Nuclear Physics: Theory*,

Experiments and Applications, edited by José-Enrique García-Ramos, Clara E. Alonso, María Victoria Andrés and Francisco Pérez-Bernal, 207–208 (2016).

- 5 Marini, P., Ducasse, Q., Jurado, B., Aiche, M., Mathieu, L., Barreau, G., Czajkowski, S., Tsekhanovich, I., Moro, A., Lei, Jin, Giacoppo, F., Gorgen, A., Torny, Audouin, L., Tassan-Got, L., Wilson, J. N., Gunsing, F., Guttormsen, M., Larsen, A. C., Lebois, M., Renstrom, T., Rose, S., Siem, S., Tveten, G. M., Wiedeking, M., Serot, O., Boutoux, G., Méot, V., Morillon, B., Denis-Petit, D., Roig, O., Oberstedt, S. and Oberstedt, A., ‘First simultaneous measurement of fission and gamma probabilities of  $^{237}\text{U}$  and  $^{239}\text{Np}$  via surrogate reactions’, EPJ Web of Conferences **122**, 12004 (2016).
- 6 P. Marini, Q. Ducasse, B. Jurado, M. Aiche, L. Mathieu, G. Barreau, S. Czajkowski, I. Tsekhanovich, A. Moro, **Jin Lei**, F. Giacoppo, A. Gorgen, Torny, L. Audouin, L. Tassan-Got, J. N. Wilson, F. Gunsing, M. Guttormsen, A. C. Larsen, M. Lebois, T. Renstrom, S. Rose, S. Siem, G. M. Tveten, M. Wiedeking, O. Serot, G. Boutoux, V. Méot, B. Morillon, D. Denis-Petit, O. Roig, S. Oberstedt and A. Oberstedt, ‘First simultaneous measurement of fission and gamma probabilities of  $^{237}\text{U}$  and  $^{239}\text{Np}$  via surrogate reactions’, EPJ Web of Conferences **122**, 12004 (2016).
- 7 A. M. Moro, **Jin Lei**, M. Gómez-Ramos, J. M. Arias, R. de Diego, J. Gómez-Camacho and J. A. Lay, ‘Recent Developments for the Calculation of Elastic and Non-elastic Breakup of Weakly-bound Nuclei’, Acta Phys. Polon. **B47**, 821 (2016).
- 8 Antonio M. Moro and **Jin Lei**, ‘Recent Advances in Nuclear Reaction Theories for Weakly Bound Nuclei: Reexamining the Problem of Inclusive Breakup’, Few-Body Systems **57**, 319–330 (2016).
- 9 J. S. Wang, Y. Y. Yang, Q. Wang, **Jin Lei**, J. B. Ma, M. R. Huang, J. L. Han, P. Ma, S. L. Jin, Z. Bai, Q. Hu, J. B. Chen, R. Wada, Z. Y. Sun, R. F. Chen, X. Y. Zhang, Z. G. Hu, X. H. Yuan, X. G. Cao, Z. G. Xu, S. W. Xu, C. Zhen, Z. Q. Chen, Z. Chen, S. Z. Chen, C. M. Du, L. M. Duan, F. Fu, B. X. Gou, J. Hu, J. J. He, X. G. Lei, S. L. Li, Y. Li, Q. Y. Lin, L. X. Liu, F. D. Shi, S. W. Tang, G. Xu, L. Y. Zhang, X. H. Zhang, W. Zhang, M. H. Zhao, Y. H. Zhang, H. S. Xu, G. Q. Xiao, S. Mukhejee, N. Keeley, K. Rusek and D. Y. Pang, ‘ $^7\text{Be}$ ,  $^8\text{B}^+$   $^{208}\text{Pb}$  Elastic Scattering at Above-Barrier Energies’, Journal of Physics: Conference Series **420**, 012075 (2013).

## Teaching

- 2019 ■ Talent Course 6: Theory for exploring nuclear reaction experiments, June 3 to 21, 2019, Michigan State University, East Lansing, MI, USA
- Graduate course, Ohio University, 2019. On a few occasions, I helped Professor Charlotte Elster teach Physics 6021 : Quantum Mechanics.

## Miscellaneous Experience

### Professional Service

- 2020 ■ Lead Organizer: Reaction Seminar, a special online seminar series for the COVID-19 period, more details can be found at <https://reactionseminar.github.io>

## Talks

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### Seminars

- *Inclusive breakup of  $^{209}\text{Bi}(^6\text{Li}, \alpha X)$  and related topics*, Reaction Seminar, Jun. 2, 2020, more details see [here](#)
- *Nuclear reactions from a three body perspective*, Beihang University, Beijing, China, Sep. 20, 2019
- *Nuclear reactions from a three body perspective*, Tsinghua University, Beijing, China, Sep. 17, 2019
- *Nuclear reactions from a three body perspective*, Peking University, Beijing, China, Sep. 11, 2019
- *Nuclear reactions in a three body model*, Ohio University, Athens, OH, USA, Feb. 13, 2019
- *Direct Nuclear Reaction in a Three-body Model*, Tongji University, Shanghai, China, Jan., 2018
- *Three-body reaction theory*, China Institute of Atomic Energy, Beijing, China, Dec., 2017
- *Three-body reaction theory in a model space*, Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing, China, Dec., 2017
- *Three-body reaction theory in a model space*, Peking University, Beijing, China, Dec., 2017
- *Study of inclusive breakup reactions induced by weakly bound nuclei*, Michigan State University, East Lansing, MI, USA, Oct. 2016

### Invited Talks at Workshops and Conferences

- *Nuclear reaction in a three body model: exploring the story in  $Q$ -space*, FRIB-Theory Alliance workshop: "From bound states to the continuum: Connecting bound state calculations with scattering and reaction theory.", East Lansing, MI, USA, June 11-22, 2018
- *Study of inclusive breakup reactions induced by weakly bound nuclei*, INT Workshop INT-17-1a, Seattle, USA, 2017

### Contributed talks at Workshops and Conferences

- *Momentum Space Faddeev Calculation of  $d + \alpha$  Scattering*, APS April, Columbus, USA, 2018
- *$^6\text{Li}$  and  $d + \alpha$  scattering in a three-body momentum space Faddeev model (I)*, DNP 2017, Pittsburgh, USA, 2017
- *Evaluation of inclusive breakup in reactions induced by weakly-bound nuclei within a three-body model*, NN2015, Catania, Italy, 2015
- *Quarter-point angle for light weakly bound projectiles*, The 8th China-Japan Joint Physics Symposium, Beijing, China, 2012

## Talks (continued)

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### Posters

- *Evaluation of inclusive breakup in reactions induced by weakly-bound nuclei within a three-body model*, Basic concepts in Physics: theory, experiments and applications, La Rabida, Spain, 2015
- *Evaluation of inclusive breakup in reactions induced by weakly-bound nuclei within a three-body model*, Euroschool on Exotic Beams, Padova, Italy, 2014

## References

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**Antonio M. Moro**

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