Marco T. Pigni

Distinguished R&D Nuclear Data Scientist

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Education

Atominstitut of the Austrian Universities, Vienna University of Technology
Ph.D. in Nuclear Physics (Dec 2006)
Dissertation Title: "Reliability of optical potentials for nuclear data evaluation"

Università degli Studi di Milano
Dottore Magistrale in Physics (Oct 2002)
Thesis Title: "Emissions of intermediate mass fragments in the interaction of ^{16}O with ^{59}Co and ^{93}Nb"

Research Activities

Oak Ridge National Laboratory, Nuclear Data Group
Distinguished R&D Nuclear Data Scientist (Apr 2011–present)

- R-Matrix analyses (nearly 20) and related uncertainty quantification from light nuclei to heavy fissile actinides supported by the U.S. Department of Energy (DOE) National Nuclear Security Administration (NNSA) within Nuclear Criticality Safety Program (NCSP)
- Fission product yield analyses for the entire library (about 50 nuclei) within Nuclear Regulatory Commission (NRC) and Defense Threat Reduction Agency (DTRA) programs
- Uncertainty quantification on resonance parameters, cross sections, neutron multiplicities, and fission product yields
- Neutron source quantification from (α, n) reactions supported by the US Department of Energy National Nuclear Security Administration Office of Defense Nuclear Nonproliferation Research and Development NA-22
- Provide mentorship to junior scientific staff

Brookhaven National Laboratory, National Nuclear Data Center
Assistant Nuclear Physicist (Jan 2010–Apr 2011)
Post-doctoral Research Associate (Jan 2007–Dec 2009)

- Project on uncertainty quantification for evaluated nuclear data libraries supported by the U.S. Department of Energy (DOE) National Nuclear Security Administration (NNSA) within Nuclear Criticality Safety Program (NCSP)
- Nuclear data analyses within Hauser-Feshbach statistical model and exciton preequilibrium model for ^{23}Na, ^{55}Mn, ^{90}Zr, and ^{239}Pu

Clearance

Q-clearance holder

Committees and advisory groups

- Nuclear Data Advisory Group (member)
- Cross Section Evaluation Working Group
  - Executive committee (member)
  - Covariance committee (member)
  - Fission product yield committee (member)
  - Charged-particle sub-library (chair)
- Nuclear Data Working Group (member)
- Working Party on International Nuclear Data Evaluation
- *R*-Matrix Workshop on Methods and Applications committee
- Consultant to the International Nuclear Data Evaluation Network at the International Atomic Energy Agency: light nuclei, structural materials, fissile heavy nuclei, charged-particle reactions, and nuclear data processing

Skills

Fortran, C++, LaTeX, GitHub, Shell scripting
Codes: SAMMY, EMPIRE, Talys, ORIGEN, NJOY, AMPX, MCNP, SCALE

Languages

Italian (native speaker)
English (full professional proficiency)
German (elementary proficiency)

Military Service

Artillery, Italian Army, "Reggimento Artiglieria a Cavallo" (2001)

Citations

Google Scholar	All	Since 2019
Citations	10807	5364
h-index	29	17
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Publications

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- E. Leal-Cidoncha, A. Couture, E. M. Bond, et al., "Measurement of the neutron-induced capture-to-fission cross section ratio in ^{233}U at LANSCE," *Phys. Rev.* C**108**, 014608 (2023)
- M. T. Pigni, "Quantification of the ^{35}Cl(n,p) reaction channel," *Progress in Nuclear Energy*, **157**, 104551 (2023)
- M. T. Pigni, R. Capote, A. Trkov, "Progress on the reevaluation and validation of the n+^{233}U neutron cross sections," *Annals of Nuclear Energy*, **163**, 108595 (2021)
- G. P. A. Nobre, M. T. Pigni, D. A. Brown, et al., "Newly evaluated neutron reaction data on chromium isotopes," *Nuclear Data Sheets*, **173**, 1 (2021)
- M. T. Pigni and S. Croft, "On the consistency of ^{16}O(n,α) cross sections," *Phys. Rev.* C**102**, 014618 (2020)
- M. T. Pigni, I. C. Gauld, S. Croft, "(α,n) reactions in oxide compounds calculated from the R-matrix theory," *Progress in Nuclear Energy*, **118**, 103130 (2020)
- I. J. Thompson, R. J. DeBoer, P. Dimitriou, et al., "Verification of *R*-matrix calculations for charged-particle reactions in the resolved resonance region for the ^{7}Be system," *E. Phys. J.* A, **55**(6), 92 (2019)
- M. B. Chadwick, R. Capote, A. Trkov, et al., "The CIELO Collaboration Summary Results: International Evaluations of Neutron Reactions on Oxygen, Iron, Uranium and Plutonium," *Nuclear Data Sheets* **148**, 189 (2018)
- R. Capote, A. Trkov, M. Sin, et al., "Evaluation of Neutron-induced Reactions on ^{235}U and ^{238}U targets up to 30 MeV," *Nuclear Data Sheets* **148**, 254 (2018)
- D. A. Brown, M. B. Chadwick, R. Capote, et al., "The 8th Major Release of the Nuclear Reaction Data Library with CIELO-project Cross Sections, New Standards and Thermal Scattering Data," *Nuclear Data Sheets* **148**, 1 (2018)
- M. T. Pigni, S. Croft, I. C. Gauld, "Uncertainty quantification in (α,n) neutron source calculations for an oxide matrix," *Progress in Nuclear Energy* **91**, 147 (2016)
- T. M. Shneidman, A. V. Andreev, C. Massimi, et al., "Angular Anisotropy of the Fission Fragments in the Dinuclear System Model," *Nucl. Phys. Review* **32**, 175 (2015)
- M. T. Pigni, M. W. Francis, I. C. Gauld, "Investigation of Inconsistent ENDF/B-VII.1 Independent and Cumulative Fission Product Yields with Proposed Revisions," *Nuclear Data Sheets* **123**, 231 (2015)
- I. C. Gauld, M. T. Pigni, G. Ilas, "Validation and Testing of ENDF/B-VII Decay Data," *Nuclear Data Sheets* **120**, 33 (2014)

- E. Leal-Cidoncha, I. Duran, C. Paradela, et al., "Study of ^{234}U(n,f) Resonances Measured at the CERN nTOF Facility," *Nuclear Data Sheets* **119**, 42 (2014)
- G. Palmiotti, M. Salvatores, G. Aliberti, et al., "Combined Use of Integral Experiments and Covariance Data," *Nuclear Data Sheets* **118**, 596 (2014)
- M. T. Pigni, L. C. Leal, M. E. Dunn, et al., "Evaluation of Tungsten Neutron Cross Sections in the Resolved Resonance Region," *Nuclear Data Sheets* **114**, 147 (2013)
- F. Belloni, M. Calviani, N. Colonna, et al., "Measurement of the neutron-induced fission cross-section of ^{241}Am at the time-of-flight facility nTOF," *Eur. Phys. J.* A**49**, 2 (2013)
- F. Gunsing, E. Berthoumieux, G. Aerts, et al., "Measurement of resolved resonances of ^{232}Th(n,γ) at the nTOF facility at CERN," *Phys. Rev.* C**85**, 064601 (2012)
- C. Guerrero D. Cano-Ott, E. Mendoza, et al., "Measurement and resonance analysis of the ^{237}Np neutron capture cross section," *Phys. Rev.* C**85**, 044616 (2012)
- C. Massimi, P. Koehler, S. Bisterzo, et al., "Resonance neutron-capture cross sections of stable magnesium isotopes and their astrophysical implications," *Phys. Rev.* C**85**, 044615 (2012)
- M. Calviani, M. H. Meaze, N. Colonna, et al., "Neutron-induced fission cross section of ^{245}Cm: New results from data taken at the time-of-flight facility nTOF," *Phys. Rev.* C**85**, 034616 (2012)
- S. Hoblit, Y. -S. Cho, M. Herman, et al., "Neutron Cross Section Covariances for Structural Materials and Fission Products," *Nuclear Data Sheets* **112**, 3075 (2011)
- M. B. Chadwick, M. Herman, P. Obložinský, et al., "ENDF/B-VII.1 Nuclear Data for Science and Technology: Cross Sections, Covariances, Fission Product Yields and Decay Data," *Nuclear Data Sheets* **112**, 2887 (2011)
- F. Belloni, M. Calviani, N. Colonna, et al., "Measurement of the neutron-induced fission cross-section of ^{243}Am relative to ^{235}U from 0.5 to 20 MeV," *Eur. Phys. J.* A**47**, 160 (2011)
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- R. Sarmento, M. Calviani, J. Praena, et al., "Measurement of the ^{236}U(n,f) cross section from 170 meV to 2 MeV at the CERN nTOF facility," *Phys. Rev.* C**84**, 044618 (2011)
- G. Tagliente, P. M. Milazzo, K. Fujii, et al., "Neutron capture on ^{94}Zr: Resonance parameters and Maxwellian-averaged cross sections," *Phys. Rev.* C**84**, 015801 (2011)
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Reports

- M. N. Dupont, D. E. Ames, G. A. Harms, et al., "Integral Experiment Request 554 CED-2 Summary Report," ORNL/TM-2023/3124 (2023)

- M. T. Pigni, J. D. McDonnell, K. H. Guber, "Resonance Parameter Evaluation of n+^{88}Sr reactions for ENDF/B-VIII.1 Library," ORNL/LTR-2023/3004 (2023)

- C. W. Chapman, M. T. Pigni, K. H. Guber, et al.,"*R*-matrix Resolved Resonance Region Evaluation of ^{140,142}Ce," ORNL/TM-2023/2924 (2023)

- M. T. Pigni, "*R*-MATRIX ANALYSIS AND STATISTICAL PROPERTIES OF DYSPROSIUM ISOTOPES IN THE NEUTRON ENERGY RANGE UP TO A FEW KEV," ORNL/TM-2023/2925 (2023)

- M. Dupont, D. Hames, G. Harms, et al., "Integral Experiment Request 554 CED-1 Summary Report," ORNL/TM-2022/2682 (2022)

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- M. T. Pigni, "Standardizing a Renewed Fission Product Yield Library and Related Covariances (Part II)," ORNL/TM-2022/2590 (2022)

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- M. S. Smith, D. A. Brown, C. E. Romano, et al., "(α,n) nuclear data scoping study," ORNL/TM-2020/1789 (2020)

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- M. T. Pigni, "ASSESSMENT OF ^{46,47,48,49,50}TI CROSS SECTIONS IN THE ENDF/B-VIII.0 LIBRARY IN THE THERMAL NEUTRON ENERGY RANGE," ORNL/LTR-2019/1285 (2019)
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- M. T. Pigni, "ASSESSMENT OF ^{23}NA CROSS SECTIONS IN THE ENDF/B-VIII.0 LIBRARY IN THE NEUTRON ENERGY RANGE UP TO 0.1 EV," ORNL/LTR-2018/487 (2018)
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- G. Ilas, I. C. Gauld, R. M. Westfall, et al., "Evaluation of Hanford B Reactor Experiments (PTA-069 and PTA-084) for Code and Data Benchmarking," ORNL/TM-2014/53 (2014)
- Members of Subgroup 24, "Covariance Data in the Fast Neutron Region," Nuclear Science NEA/WPEC-24, NEA/NSC/WPEC/DOC(2010)427, OECD/NEA (2011)
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- H. Leeb, K. Nikolics, and M. T. Pigni, "Theoretical calculations of covariances for reactions on Oxygen isotopes," Internal Report TTMN-2006-139
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- M. T. Pigni and H. Leeb, "Covariance analysis of the ^{151}Sm(n,γ) measurements at the nTOF facility at CERN," Internal Report ATI-NDC-2004-02
- M. T. Pigni and H. Leeb, "Covariances for nuclear data evaluations strongly relying on modeling," Internal Report EFF-DOC-888

Conference Proceedings

- G. Arbanas, A. Holcomb, M. T. Pigni, et al., "Effective R-Matrix Parameterizations for Nuclear Data," EPJ Web of Conferences **294**, 04007 (2024)

- M. T. Pigni, R. Capote, A. Trkov, "Low-Energy Reactions of the n+^{233}U Nuclear Compound System and Its Initial Validation," 2021 ANS Winter Meeting and Technology Expo **125**, 581–584 (2022)

- D. Wiarda, M. T. Pigni, V. Sobes, et al., "Dr. Mark Williams' Three Contributions to nuclear Data Covariance," *Transactions*, **121**, 1, 1496 (2019)

- C. Chapman, M. T. Pigni, K. H. Guber, "Progress on ^{140,142}Ce Neutron Cross Section Resolved Resonance Region Evaluations," 11$^{\text{th}}$ International Conference on Nuclear Criticality Safety (ICNC 2019), 15–20 September, Paris, France

- G. Arbanas, J. Feng, Z. J. Clifton, et al., "Bayesian optimization of generalized data," 4$^{\text{th}}$ International Workshop on Nuclear Data Covariances (CW2017), 2–6 October, 2017, Aix en Provance, France, EPJ Web of Conferences **4**, 30 (2018)

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- M. T. Pigni and L. C. Leal, "EVALUATED ^{182,183,184,186}W NEUTRON CROSS SECTIONS AND COVARIANCES IN THE RESOLVED RESONANCE REGION," ICNC 2015, Charlotte, North Carolina, September 13-17, 2015

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- T. M. Shneidman, A. V. Andreev, M. T. Pigni, et al., "Angular Anisotropy of the Fission Fragments in the Dinuclear System Model," Nuclear Theory Vol. 31, ed. A. Georgieva, N. Minkov, Heron Press, Sofia (2012) p. 25

- T. M. Shneidman, A. V. Andreev, M. T. Pigni, et al., "Collective spectra along the fission barrier," NSRT12 - International Conference on Nuclear Structure and Related Topics, Dubna, Russia, July 3-7, 2012, EPJ Web of Conferences Vol. 38 (2012)

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