

## Dan McCammon

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**EDUCATION**            B.A. Physics, California Institute of Technology, 1966  
                              Ph.D. Physics, University of Wisconsin, 1971

### EMPLOYMENT

1980-            Assistant—Associate—Full Professor, Department of Physics, University of Wisconsin  
1976-80        Assistant—Associate Scientist, X-ray Astronomy Group, University of Wisconsin  
1974-76        Foreign Specialist in Physics, Prince of Songkhla University, Songkhla, Thailand  
1971-74        Research Associate, X-ray Astronomy Group, University of Wisconsin

### RESEARCH ACTIVITIES

#### *General:*

Studies of the soft X-ray diffuse background: particularly in the 0.05 - 1 keV range, with the goal of better understanding the interstellar and intergalactic media.

X-ray detector development: including low-background proportional counters and cryogenic microcalorimeters with 1-10 eV FWHM resolution in the 0.05 - 10 keV energy range.

Laboratory measurements of X-ray line emission from charge exchange for astronomical uses.

#### *Space Missions:*

Wisconsin Diffuse Sky Survey: helped develop proportional counter detectors and filters used to produce all-sky maps in seven energy bands in the 0.1 - 6 keV energy range on a series of ten sounding rocket flights. Assisted in all flight and analysis activities.

Apollo S-150 survey: Assisted in the development and calibration of detectors and star sensors.

*OSO VIII* soft X-ray experiment: Assisted in development of coaxial anode detectors for background suppression and in data analysis.

*ROSAT* Diffuse Sky Survey: Led effort to produce *ROSAT* all-sky diffuse background maps in collaboration with Max Planck Institute for Extraterrestrial Physics (U.S. PI).

Diffuse X-ray Spectrometer: Designed and built large area Bragg crystal spectrometer for attached Shuttle mission. Obtained first high-resolution spectrum of  $\frac{1}{4}$ -keV diffuse background.

X-ray Quantum Calorimeter: PI on sounding rocket experiment to obtain high resolution spectra of the diffuse X-ray background. Worked on developing detectors and led effort to design and construct cryogenic payload.

*Astro-E/E2* XRS instrument: Worked on X-ray microcalorimeter detector development and testing. Supervised construction of adiabatic demagnetization refrigerator salt pill and internal calibration sources at Wisconsin.

*Astro-H* SXS instrument: Provide IR/vis/UV blocking filter supports and internal calibration source.

*XRISM* Resolve instrument: ditto

#### *Current:*

Reflight of XQC experiment with improved detectors to study diffuse X-ray background. Continued development of high resolution microcalorimeters. Construction and flight of new rocket instrument for 100-500 eV diffuse X-ray spectroscopy. Development of IR blocking filters with good EUV transmission. Laboratory measurements of partial cross sections for X-ray line production by charge exchange with heavy ions (collaboration with ORNL). Analysis of Suzaku, rocket, and other observations for understanding soft X-ray background. Assisting with sounding rocket cryogenics and blocking filters for Micro-Cal transition-edge sensor experiment at Northwestern, with applications of microcalorimeter detectors to direct measurements of neutrino mass at the University of Milano, and to measurements of the Lamb shift in hydrogenic Uranium at GSI in Darmstadt. P.I. on XQCSat, a proposal for a SmallSat (new P.I.-class NASA mission with \$35M cap).

### PROFESSIONAL SERVICE

NASA Sounding Rocket Working Group, ASTRO-D International Advisor Committee, NAS Task Group on Space Astronomy and Astrophysics, NASA Structure and Evolution of the Universe Technology Working Group, NASA Astrophysics Working Group, AAS High Energy Astrophysics Division Executive Committee, High Energy from Space Panel of NAS 2000 Decadal Survey, NASA Structure and Evolution of the Universe Subcommittee, Host and co-chair for the 9th International Workshop on Low Temperature Detectors, NRC Ad Hoc Committee on the review of the NASA Science Mission Directorate Science Plan. Astro2010 Decadal Survey steering committee. Chair, Astrophysics Division of American Physical Society. NASA Senior Review. NASA Explorer proposal evaluation.

### AWARDS:

American Physical Society Fellow, Romnes Faculty Fellowship, Vilas Associate, NASA Exceptional Public Achievement Medal.

## SELECTED PUBLICATIONS:

- “Neutral Hydrogen in the Direction of the Small Magellanic Cloud and the Limits on an Extragalactic Soft X-Ray Flux”, D. McCammon, **S. Meyer, W. T. Sanders, and F. O. Williamson**, Ap. J., 209, 46 (1976).
- “Interstellar Photoelectric Cross Sections, 0.03-10 keV”, **R. Morrison** and D. McCammon, Ap. J., 270, 119 (1983).
- “Thermal Detectors as X-ray Spectrometers,” S. H. Moseley, J. C. Mather and D. McCammon, J. of Applied Physics, 56, 1257 (1984).
- “The Structure of Galactic HI in Directions of Low Total Column Density,” F. J. Lockman, **K. Jahoda**, and D. McCammon, Ap. J., 302, 432 (1986).
- “The Soft X-ray Background and its Origins,” D. McCammon and **W. T. Sanders**, in Annual Reviews of Astronomy and Astrophysics, Volume 28, ed. G. Burbidge (Palo Alto: Annual Reviews, Inc.), pp 657 - 688 (1990).
- “*ROSAT* Survey Diffuse Background Maps, Paper II”, **S.L. Snowden**, R. Egger, M.J. Freyberg, **P.P. Plucinsky**, J.H.M.M Schmitt, J. Trümper, W. Voges, D. McCammon, and **W.T. Sanders**, Ap.J. 485, 125, (1997).
- “Direct Measurement of the L/K Ratio in  $^7\text{Be}$  Electron Capture,” P. A. Voytas, C. Ternovan, **M. Galeazzi**, D. McCammon, J. J. Kolata, P. Santi, D. Peterson, V. Guimarães, F. D. Becchetti, M. Y. Lee, T. W. O’Donnell, D. A. Roberts, and S. Shaheen, Phys. Rev. Lett. 88, 12501, (2001)
- “A High Spectral Resolution Observation of the Soft X-ray Diffuse Background with Thermal Detectors”, D. McCammon, **R. Almy, E. Apodaca, W. Bergmann, S. Deiker, M. Galeazzi, M. Juda, A. Lesser, W. T. Sanders**, E. Figueroa, R.L. Kelley, F.S. Porter, C.K. Stahle, and A.E. Szymkowiak, ApJ 576, 188, (2002).
- “Thermal Equilibrium Calorimeters — An Introduction”, D. McCammon, in *Cryogenic Particle Detection*, Christian Enss (ed.), Topics in Applied Physics 99, (Springer; Berlin 2005) pp 1-34
- “Observed Limits on Charge Exchange Contributions to the Diffuse X-Ray Background,” **Crowder, S. G., Barger, K. A., Brandl, D. E.**, Eckart, M. E., Galeazzi, M., Kelley, R. L., Kilbourne, C. A., McCammon, D., **Pfendner, C. G.**, Porter, F. S., **Rocks, L.**, Szymkowiak, A. E., **Teplin, I. M.**, Astrophys. J. 758, 143, (2012)
- “The origin of the local 1/4-keV X-ray flux in both charge exchange and a hot bubble,” Galeazzi M., Chiao, M., Collier, M. R., Cravens, T., Koutroumpa, D., Kuntz, K. D., Lallement, R., Lepri, S. T., McCammon, D., Morgan, K., Porter, F. S., Robertson, I. P., Snowden, S. L., Thomas, N. E., Uprety, Y., Ursino, E., Walsh, B. M., Nature 512, 171, (2014)
- “The Quiet Intracluster Medium in the Core of the Perseus Cluster,” F. Aharonian et al. (Hitomi collaboration), Nature 535, 117 (2016)
- “The Structure of the Local Hot Bubble,” W. Liu, M. Chiao, M. R. Collier, T. Cravens, M. Galeazzi, D. Koutroumpa, K. D. Kuntz, R. Lallement, S. T. Lepri, D. McCammon, **K. Morgan**, F. S. Porter, S. L. Snowden, N. E. Thomas, Y. Uprety, E. Ursino, and B. M. Walsh, Ap. J. 834, 33 (2017)
- “Mapping of the resistance of a superconducting transition edge sensor as a function of temperature, current, and applied magnetic field,” **S. Zhang**, M. E. Eckart, **F.T. Jaeckel**, **K. L. Kripps**, D. McCammon, **K. M. Morgan**, and **Yu Zhou**, Journal of Applied Physics 121, 074503 (2017)
- “A High Spectral Resolution Study of the Soft X-ray Background with the X-ray Quantum Calorimeter,” **Dallas Wulf**, Megan E Eckart, Massimiliano Galeazzi, **Felix Jaeckel**, Richard L Kelley, Caroline A Kilbourne, **Kelsey M Morgan**, Dan McCammon, F Scott Porter, Andrew E Szymkowiak, Ap. J. 884, 120 (2019)
- “Optimal filtering of overlapped pulses in microcalorimeter data,” **Dallas Wulf, Felix Jaeckel**, Dan McCammon, James A Chervenak, and Megan E Eckart, Journal of Applied Physics 128, 174503 (2020)
- “Calibration and Testing of Small High-Resolution Transition Edge Sensor Microcalorimeters with Optical Photons,” **Felix T. Jaeckel, C. V. Ambarish, Haoran Dai, Shukai Liu**, Dan McCammon, **Mari McPheron, Kari L. Nelms, Avirup Roy, Haley R. Stueber**, Simon R. Bandler, James A. Chervenak, Kazuhiro Sakai, Stephen J. Smith, IEEE Transactions on Applied Superconductivity - in press (2021)