

Michel Nuevo

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RESEARCH INTERESTS

From a general point of view, I experimentally study how organic matter forms in the solid phase in astrophysical environments (interstellar medium, comets, etc.) from the UV photo-irradiation of cosmic ice mixtures (e.g., H₂O, CH₃OH, CO, CO₂, NH₃, etc.) at very low temperature. In such irradiation experiments, a large number and variety of molecules of prebiotic and biological interests including amino acids and nucleobases have been identified, indicating that carbon-based chemistry is a general phenomenon in the Universe. Comparing these results with analyses of carbonaceous meteorites and their organic contents helps us understand better the evolution of organic matter from the astrophysical environments where they are formed, to their incorporation in the forming stellar and planetary systems, and their delivery to telluric planets.

EDUCATION

2005 Ph.D., Astrophysics and Instrumentation (Université Paris-Sud, Orsay, France).
2001 M. Sc., Astrophysics and Instrumentation (Université Pierre et Marie Curie, Paris, France), and Molecular Physico-Chemistry (Université Paris-Sud, Orsay, France).

RESEARCH EXPERIENCES

2007–present NPP fellow at NASA Ames Research Center, Moffett Field, CA. *Photochemistry of pyrimidine and purine in ices of astrophysical interest, and formation of nucleobases* (advisor: Dr. Scott A. Sandford).
2005–2007 NSC and NCU postdoctoral fellow at the Graduate Institute of Astronomy and the Department of Physics, National Central University (NCU), Jhongli, Taiwan. *Evolution of interstellar ice analogs to the formation of organic matter after UV photon irradiation and energetic ion bombardment* (advisors: Prs. Wing-Huen Ip and Tai-Sone Yih).
2001–2005 Doctoral fellow at the Institut d'Astrophysique Spatiale, Université Paris-Sud, Orsay, France. *Photolysis of interstellar ice and production of organic molecules: laboratory simulations* (in French) (advisor: Dr. Louis d'Hendecourt).

SCIENTIFIC SOCIETY MEMBERSHIPS

Asia Oceania Geosciences Society (AOGS) (2005–present)
International Society for the Study of the Origin of Life (ISSOL) (2008–present)
Japan Geoscience Union (JpGU) (2009)

PUBLICATIONS

- Nuevo M., Milam S.N., Sandford S.A., Elsila J.E., and Dworkin J.P. Formation of uracil from the UV photo-irradiation of pyrimidine in H₂O pure ices. Accepted in *Astrobiology* (March 2009).
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- Chen Y.-J., Nuevo M., Yih T.-S., Ip W.-H., Fung H.-S., Cheng C.-Y., Tsai H.-R., and Wu C.-Y.R., 2008. Amino acids produced from the UV/EUV irradiation of naphthalene in a H₂O+NH₃ ice mixture. *MNRAS*, **384**, 605–610.
- Nuevo M., Auger G., Blanot D., and d’Hendecourt L., 2008. A detailed analysis of the amino acids produced from the UV irradiation of interstellar ice analogs. *OLEB*, **38**, 37–56.
- Nuevo M., Chen Y.-J., Yih T.-S., Ip W.-H., Fung H.-S., Cheng C.-Y., Tsai H.-R., and Wu C.-Y.R., 2007. Amino acids formed from the UV/EUV irradiation of inorganic ices of astrophysical interest. *Adv. Space Res.*, **40**, 1628–1633.
- Chen Y.-J., Nuevo M., Yeh F.-C., Yih T.-S., Sun W.-H., Ip W.-H., Fung H.-S., Chiang S.-Y., Lee Y.-Y., Chen J.-M., and Wu C.-Y.R. Infrared study of the UV/EUV irradiation of naphthalene in H₂O+NH₃ ice. In *Advances in Geosciences, Vol. 7: Planetary Science*, W.-H. Ip and A. Bhardwaj, Eds., World Scientific Publishing Company, Singapore, pp. 79–91 (2007).
- Nuevo M., Meierhenrich U.J., d’Hendecourt L., Muñoz Caro G.M., Dartois E., Deboffle D., Thiemann W.H.-P., Bredehöft J.H., and Nahon L., 2007. Enantiomeric separation of complex organic molecules produced from irradiation of interstellar/circumstellar ice analogs. *Adv. Space Res.*, **39**, 400–404.
- Chen Y.-J., Nuevo M., Hsieh J.-M., Yih T.-S., Sun W.-H., Ip W.-H., Fung H.-S., Chiang S.-Y., Lee Y.-Y., Chen J.-M., and Wu C.-Y.R., 2007. Carbamic acid produced by the UV/EUV irradiation of interstellar ice analogs. *A&A*, **464**, 253–257.
- Muñoz Caro G.M., Matrajt G., Dartois E., Nuevo M., d’Hendecourt L., Deboffle D., Montagnac G., Chauvin N., Boukari C., and Le Du D., 2006. Nature and evolution of the dominant carbonaceous matter in interplanetary dust particles: effects of irradiation and identification with a type of amorphous carbon. *A&A*, **459**, 147–159.
- Nuevo M., Meierhenrich U.J., Muñoz Caro G.M., Dartois E., d’Hendecourt L., Deboffle D., Auger G., Blanot D., Bredehöft J.H., and Nahon L., 2006. The effects of circularly polarized light on amino acid enantiomers produced by the UV irradiation of interstellar ice analogs. *A&A*, **457**, 741–751.