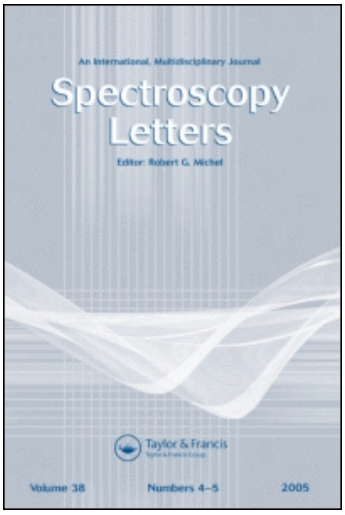

Spectroscopy Letters
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713597299

Remembering Olivier Guillot-Noël

Online publication date: 30 July 2010

To cite this Article (2010) 'Remembering Olivier Guillot-Noël', Spectroscopy Letters, 43: 5, 319 — 320
To link to this Article: DOI: 10.1080/00387010.2010.486703
URL: http://dx.doi.org/10.1080/00387010.2010.486703

Spectroscopy Letters, 43:319–320, 2010

ISSN: 0038-7010 print/1532-2289 online
DOI: 10.1080/00387010.2010.486703

Taylor & Francis
Taylor & Francis Group

Remembering Olivier Guillot-Noël

Olivier Guillot-Noël was a bright scientist as well as a man who loved life, appreciated by all for his kindness and dynamism.

He graduated in 1994 from the "Ecole Nationale Supérieure de Chimie de Paris" (ENSCP) a chemical engineering school (the French equivalent to a technical university) and, right from the beginning, was interested more by quantum mechanics and spectroscopy than by chemistry. Accordingly, he started a thesis entitled "Transition probabilities and absorption linewidths in the laser host YVO_4:Nd: Nd-Nd, Nd-host interactions, crystal field effects and the chemical bond" in the Condensed Matter Chemistry Laboratory of ENSCP. During these years, he became interested in magnetic effects in rare earth (RE) ions through the use of Electron Paramagnetic Resonance (EPR) spectroscopy, a technique which can reveal the fine details of RE energy level structure, energy and wavefunctions. In particular, he was able to model the energy level structure of RE pairs and identify them in satellite lines of Nd doped YVO_4, a widely used laser host.[1] This was much easier than using optical spectroscopy because the optical inhomogeneous linewidth normally hides these weak interactions. He defended his thesis in 1997 and moved to Delft technical university to study Ce doped crystals for scintillation. Therein, he published the first paper on $LaCl_3$:Ce, which is one of the most efficient crystals known today.[2] After two years in the Netherlands, he came back to ENSCP and obtained a position as a junior researcher at CNRS in 2000. Relying on his knowledge of RE interactions and his taste for theory, he studied intrinsic optical bistability in interacting atomic systems. At the time, the physics of the phenomenon was not well understood and several models and analyses had been published with opposite conclusions. Olivier was finally able to resolve the problems with a description which could cover previous ones depending on approximations and relative interaction times.[3]

Experimental work followed with the start of an independent group in the laboratory devoted to materials for optical information processing in 2002. Soon, contacts were established with the groups of Stefan Kröll (Lund, Sweden) and Jean-Louis Le Gouët (Orsay, France) to work on a project where RE ions could be used as quantum bits. This was very appropriate since magnetic interactions were central to the use of RE ions in the quantum computing schemes. Especially, the use of an external magnetic field can be necessary to ensure proper transition branching ratios. Olivier immersed in the theory of RE atomic structure, including Zeeman and hyperfine effects. This is especially complex since much of the corresponding literature contains a lot of mistakes in formulae and matrix elements. Nevertheless, after establishing correct expressions, application of the theory to Tm:YAG was very successful as it predicted the optimal magnetic field to obtain a Λ-system in this material.[4]

Afterwards, these calculations were repeated in other materials with very good agreement among experiments. Materials synthesis and characterization was also part of the group activity and a high resolution optical experiment was set up to test new crystals. Among them $La_2(WO_4)_3:Pr^{3+}$ exhibits a low inhomogeneous linewidth and long coherence lifetimes, despite the high magnetic moment of lanthanum. This compound is one of the very few solids in which narrow electromagnetically induced transparency has been observed.[5] This result was part of new projects on solid state quantum memories in collaboration within a small network of European groups (J.L. Le Gouët, Orsay; S. Kröll, Lund; N. Gisin, Geneva; T. Halfmann, Darmstadt; D. Süter, Dortmund). Olivier also wanted to use EPR pulsed spectroscopy as a tool to characterize and manipulate RE ions.[6] Ivan Lorgeré and himself had found schemes in RE crystals to use multiple resonances (optical, RF, microwave) in order to build quantum gates. Their tragic travel to Brazil was part of this project.

During his short career, Olivier was the author or co-author of more than 60 papers and 40 oral communications. He presented 11 invited talks, was awarded in 2006 the Aimé Cotton prize of the French physical society, and supervised four PhD students.

Olivier was a man of extraordinary energy and dedication to physics. He was bright, ready to take challenges, and was the main source of momentum in the group. His cheerfulness was valued by colleagues as well as his sometimes provoking attitude. He was a fair person and did not like compromises. He was 37 years old.

He is missed by many friends and coworkers throughout the rare-earth community. His disappearance is a tragic loss for his family and especially his young daughter.

REFERENCES

1. Guillot-Noël, O.; Mehta, V.; Viana, B.; Gourier, D.; Boukhris, M.; Jandl, S. Evidence of ferromagnetically coupled Nd^{3+} ions pairs in weakly doped Nd :$LiYF_4$ and Nd :YVO_4 crystals, as revealed by high resolution optical and electron paramagnetic resonance spectroscopies. *Phys. Rev. B* **2000**, *61*, 15338.
2. Guillot-Noël, O.; de Haas, J. T. M.; Dorenbos, P.; van Eijk, C. W. E.; Krämer, K. W.; Güdel, H. U. Optical and scintillation properties of cerium-doped $LaCl_3$, $LuBr_3$ and $LuCl_3$. *J. Lumin.* **1999**, *85*, 21.
3. Guillot-Noël, O.; Binet, L.; Gourier, D. General conditions for intrinsic optical bistability at atomic and molecular scale: an effective spin-Hamiltonian approach. *Phys. Rev. B* **2002**, *65*, 245101.
4. Guillot-Noël, O.; Goldner, Ph.; Antic-Fidancev, E.; Le Gouët, J. L. Analysis of magnetic interaction in rare earth doped crystals for quantum manipulation. *Phys Rev. B* **2005**, *71*, 174409.
5. Goldner, Ph.; Guillot-Noël, O.; Beaudoux, F.; Le Du, Y.; Lejay, J.; Chanelière, T.; Le Gouët, J.-L.; Rippe, L.; Amari, A.; Walther, A.; Kröll, S. Long coherence lifetime in a highly spin concentrated solid.
6. Guillot-Noël, O.; Goldner, Ph.; Beaudoux, F.; Vincent, J.; Lejay, J.; Vezin, H. Direct observation of rare-earth-host interactions in Er:Y_2SiO_5. *Phys. Rev. B* **2007**, *76*, 180408.