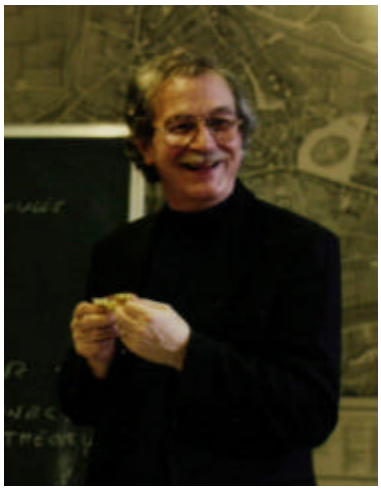
In memoriam of Professor Pier Luigi Nordio, 1936-1998:

An appreciation by C. Zannoni, Bologna University.

It is with deep regret that we bring to the attention of the Liquid Crystal community the untimely death, on October 20, 1998, of Pier Luigi Nordio, Professor of Theoretical Chemistry at Padova University (Italy), and author of many important contributions to the Theory of Liquid Crystals.



Pier Luigi Nordio was born in Padova on May 18, 1936 and he graduated in Chemistry in 1961 in Padova with Giovanni Giacometti with top marks and *laude*. He started lecturing immediately, first in Bologna University from 1961 to 1964, then in Padova since 1966. He became Full Professor of Theoretical Chemistry in 1975 and was first appointed in Trieste and then returned to Padova University, where he has been since 1976. He served as a member of the Administration Board of the University in the years 1980-81 and as Director of the Department of Physical Chemistry from 1985 to 1990.

He directed various national and international level collaborative research projects. In particular he co-ordinated the European Union (EU) network "*Organization and Dynamics of Molecules in Ordered Phases: Integration of Experiments, Theoretical Models and Simulations*" (1993-97). He was now co-ordinating the Training and Mobility of Researchers (TMR) network "*Molecular Design of Functional Liquid Crystals*" (1997-2001) comprising liquid crystal groups from nine European Universities (Padova, Bologna, Freiburg, Hull, Nova de Lisboa, Patras, Southampton, Strasbourg, Zaragoza). These EU projects are approved on a very competitive basis and the fact that he was designated as a co-ordinator and successful in this effort is certainly a sign of the respect and consideration he received by his colleagues internationally.

Pier Luigi's links with the Liquid Crystal community were particularly strong. He was a member of the Italian and of the International Liquid Crystal Society and sat on the Editorial Board of "Liquid Crystals". He was invited speaker at a number of international Liquid Crystal meetings, including various NATO Schools starting with the famous one "The Molecular Physics of Liquid Crystals", organised by George Gray and Geoffrey Luckhurst in Cambridge in 1977, the 14th International Liquid Crystal Conference, Pisa 1992, the American Chemical Society Meeting "Liquid Crystals: Fundamentals and Applications", Anaheim (Ca., U.S.A.) 1995 and many others.

His research interests were wide and touched a number of topics mainly, but not only dealing with Liquid Crystals. In the first few years after his *laurea* his work was not directly connected with Liquid Crystals, but he worked mainly on Quantum Chemistry, including Molecular Orbital calculations of Electron Spin Resonance (ESR) properties (e.g. hyperfine constants) in organic radicals. He then spent a postdoctoral period with Harden McConnell at Stanford University from 1964 to 1966 and some of the work from that period, particularly that introducing the use of spin probes[1] was particularly influential and is still very well quoted.

At the end of the sixties the first experimental papers on ESR and NMR studies of solutes dissolved in nematic liquid crystals had started to appear and a number of linewidth effects had been observed, while a theory suitable to their interpretation was not yet available. Pier Luigi and his co-workers tackled the problem and his first papers dealing with Liquid Crystals, which developed a theory of rotational diffusion for a molecule in an anisotropic fluid and its application to ESR, were truly seminal and now classical works [2]. They allowed the extraction of information on the rotational mobility of a molecule dissolved in liquid crystals from a variety of spectroscopic observables. Over the years Pier Luigi applied his rotational diffusion

theory to the interpretation of data coming from many experimental techniques, including NMR, Dielectric Relaxation, Far Infrared and Neutron Scattering. Pier Luigi conserved a deep interest in the description of molecular motion throughout his career and the original theory of rotational diffusion for rigid molecules was generalized by him and his Padova School to flexible molecules and aliphatic chains, with the inclusion of segmental motions and conformational transitions[3]. More recently sophisticated generalized stochastic models going beyond diffusion were also being developed[4]. The range of applications further extended, with the increased power of the tools developed: a recent one is for instance the study of Charge Transfer systems and the coupling between internal and solvent degrees of freedom and its effect on spectroscopic observables such as the Stokes shift[5].

Nordio's contributions to the theory of molecular relaxation and dynamics in liquid crystals have marked important developments and I believe will remain and maintain his memory. However, Pier Luigi was also active and successful in developing Statistical Theories of liquid crystalline behaviour. It is a pleasure to recall that his first paper in this area was one on the Mean Field Theory of biaxial molecules that we wrote more than twenty years ago together with Geoffrey Luckhurst, with whom I was doing my Ph.D. in Southampton[6]. The collaboration of Pier Luigi with Geoffrey Luckhurst continued and increased over the years touching many topics: dimers with a flexible spacer and their transition properties[7], odd - even effects, re-entrant phases, biaxial nematics and molecular models for the interpretation of the orientational order of solutes of arbitrary complexity based on their molecule shape[8]. In this original approach the alignment of a solute in a nematic is estimated from a surface tensor obtained from the structure of the guest molecule. Pier Luigi and his group recently developed a molecular interpretation and prediction of chiral induction based on this type of shape models[9] and he was as keen as always to discuss it and compare its predictions with experimentalists in Italy, like Giovanni Gottarelli, and abroad.

Nordio's scientific contributions have been published in over 110 papers in international Journals and multi-author books. A list, from 1994, can be found at the Padova group web site (http://www.tmr-licrys.chfi.unipd.it/~theochem/pubs.html).

He also thought and wrote about the University, and how it should be organised and I would like to recall a recent article on a proposed re-organisation of the Italian Chemistry curriculum with his organic and inorganic colleagues Gianfranco Scorrano and Eugenio Tondello[10].

It is clearly impossible to summarise a lifetime's work and achievement and even just to mention the many deep and fruitful international collaborations in these few words, but I would like to say at least that Pier Luigi was an example of high standards in many ways.

All of his friends will not forget his clear deep thinking and rigorous approach, but also his sense of duty. To give an idea of what I mean, I would like to remember the professionality and dignity with which he co-ordinated, just a few weeks before his death, the meeting of our TMR network in Algarve, Portugal. I met him at Bologna Airport, which he was able to reach only after leaving Hospital, at his request, on that very departure day. He never complained about physical problems, but instead he talked of science and of his many cultural interests, from history to nature, with the usual enthusiasm, strength and inspiration. His wife Francesca, his daughter Daria and sons Claudio and Michele should be rightly proud of his memory and can be sure that he will be remembered in the Italian and International scientific communities.

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