

Andrew Richard Lang (1924–2008)

Distinguished for his pioneering studies in X-ray diffraction physics, especially for his developments of the techniques of X-ray topography, Andrew Lang will be greatly missed by many for his detailed knowledge of crystal physics. His topographic techniques image one- and two-dimensional imperfections in crystals: such as dislocations, stacking faults, growth-sector boundaries and ferromagnetic domains. The projection topograph is often called the ‘Lang method’. For the past 50 years, Lang’s methods have been widely used in the assessment of crystals for the electronics, diamond and other industries. An example of an application using synchrotron X-



radiation was his measuring and mapping of the relative lattice constant across a large (5 mm) synthetic diamond, to an accuracy better than one part per million.

Lang had studied many types of X-ray diffraction phenomena: X-ray Moiré fringes, the first direct observation of a refractive index for X-rays greater than unity, and Borr-

mann–Lehmann fringes. His most important discovery in this category (with Norio Kato in 1959) was that of *Pendellösung* fringes in wedge-shaped perfect crystals. The fringe spacing provides a determination of absolute structure amplitudes.

He had also made significant discoveries using other techniques, especially electron microscopy and cathodoluminescence, separately and in combination with X-ray topography; and he had also studied a wide range of crystalline materials, including metals, semiconductors, quartz and diamond. His first published paper (1947) was on the crystal structure of a crossed-chain potassium soap.

Andrew Lang’s work exhibited sustained innovativeness, craftsmanship in experimentation, and perceptiveness and thoroughness in the analysis of experiments. The topographic images that he produced were of the very highest quality and were often exceedingly beautiful.

Andrew Lang was born in 1924 at St Annes-on-Sea, England. He obtained a First-Class Honours London External BSc in Physics at Exeter in 1944, a London External MSc in 1947 and a Cambridge PhD in 1953. He had worked in industrial research in England (Lever Brothers and Unilever Ltd) and in USA (Philips Laboratories, Irvington-on-Hudson, NY). He taught at Harvard University (1953–1959). He had been at the University of Bristol ever since 1960, where he had been promoted to Professor of Physics in 1979.

He had been Chairman of the American Crystallographic Association Apparatus and Standards Sub-Committee (1957–1959); Consultant, Smithsonian Astrophysical Laboratory (1957–1959); Associate Editor, *Journal of Crystal Growth* (1966–1990); and Member of the UK SERC Synchrotron Radiation Facility Committee (1976–1978). In 1964, he was awarded the Charles Vernon Boys Prize of the Institute of Physics and the Physical Society. He was elected a Fellow of the Royal Society in 1975 and was awarded the Royal Society Hughes Medal in 1997.

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