# MS50 History of ECA, history of crystallography: contributions to and of crystallography

Chairs: Menahem Kaftory, Peter Paufler

## MS50-P1 Franciscan Brixy, the first Laue's follower in Croatia

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Laue discovered diffraction of X-rays in 1912 and the Braggs determined the first crystal structures in 1913. Soon after that, Bernardo Brixy (1882-1945) published papers, in Croatian, on properties and interference of X-rays. The titles of the papers and journals, translated in English, are: X-rays and new discoveries, *Croatian Education*, Society of Croatian Writers, Zagreb, **3**(1916) 155-160, 251-258, 368-375; Theory of interference of X-rays in a general case, *Educational Journal*, Society of Croatian Teachers, Zagreb, **26**(1917) 1-17; Cathode and X-rays, *Our Thought*, Croatian and Slovenian Franciscans, Sarajevo, **32**(1918) 94-100. Brixy was graduated in theology, mathematics and physics at the University of Zagreb. He was the author of textbooks and papers published in Croatian and German journals. Brixy described in detail the collected knowledge on X-rays, the main facts being as follows. The point of impact of cathode rays on a solid is the source of X-rays, which propagate along straight lines by the speed of light. The absorption of X-rays in a material depends on its chemical composition. X-rays are *inhomogeneous*, showing a spread of wavelengths. The impact of X-rays on a solid causes the emission of secondary rays: b-rays, *diffuse* X-rays (*i.e.* incoherent scattering) and characteristic, *homogeneous*, X-rays. The wavelengths of the characteristic X-rays depend on the chemical elements contained in the solid. The emission of characteristic X-rays can be induced in an element if its atomic number is smaller than that of the element which is the source of primary X-rays. The nature of X-rays is very similar to that of light, as both radiations exhibit interference, diffraction and polarization. The wavelength of X-rays is comparable to the distance among neighbouring atoms in the crystal. The interference maxima appear in directions for which X-rays, coherently scattered by atoms in the crystal, are in phase. Brixy compared Laue's theory of interference of X-rays and W. L. Bragg's theory of reflection of X-rays (considered as particles) from crystal lattice planes. He elaborated a rigorous theory of interference of X-rays scattered by a triclinic crystal, developing expressions for conditions of appearance and for intensities of the principal and subsidiary diffraction maxima. He found conditions under which the intensity of subsidiary maxima became negligible. Brixy proposed a number of crystallographic terms in Croatian, many of them being nowadays in use.

**Keywords:** X-rays, X-ray diffraction, Bernardo Brixy