# Thin Film Technology for Preparation of X-ray Waveguide-Resonators

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The invention of planar x-ray waveguide-resonator (PXWR) is the great present for nanotechnology and the direct challenge for x-ray synchrotron facilities [1]. PXWR is a very simple device but it allows to form thread x-ray beams with width 7÷200 nm characterized by an enhanced radiation density and a low flux angular divergence. These devices have beautiful perspectives for fundamental material researches and a wide practical applications. So, it is very important to pay attention to the technological peculiarities of it's preparation.

The waveguide-resonator is formed by couple planar dielectric reflectors placed opposite each other on distance, which must be smaller as the coherence length of the quasimonochromatic x-ray radiation transported by the device. The distance is defined by the thickness of strips deposited on edges of one reflector in the couple. According to our opinion, the deposit technology must supply a very high thickness uniformity on all length of the strips [2]. But for the practical purposes it is very important to know the critical value for the strips thickness nonuniformity. This work is devoted to the discussion of the technological thickness inaccuracy at the strips deposition and to the evaluation of permissible non-parallelism between reflectors forming the waveguide-resonance channel. The experimental results to be presented demonstrate that the typical standard inaccuracy of the conventional methods of long coating deposition $l \approx 100$ mm is acceptable for PXWR preparation.

[1] V.K. Egorov, E.V. Egorov. Background of X-ray nanophotonics based on the planar air waveguide-resonator // X-ray Spectrometry. V36. 2007. pp. 381-397.

[2] V.K. Egorov, E.V. Egorov. Application on an planar X-ray waveguide for structure study of thin film coating // Thin Solid Films. V398-399. 2001. pp. 405-412.