# X-RAY WAVEGUIDES: HIGH RESOLUTION HIGH GAIN X-RAY MICROSCOPY OBJECTIVES

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Thin film X-ray waveguides were introduced very recently as a novel and unconventional means for the production of x-ray microbeams [1,2]. They permit to obtain reliably x-ray beams with one dimension as small as 100 nm [3] or even smaller, as could be verified experimentally in some new microscope schemes [4,5] where a spatial resolution of the order of 100 nm has been achieved. This resolution is an intrinsic limit of the experimental set-up and is not depending on the source parameters. A single object can provide an intensity gain compared to the incident intensity over a rather large photon energy range limited, however, to the x-ray regime. Here we will discuss in a simple approach the theoretical limitations in gain and in tuning range and confront them with experimental data obtained recently. The theoretically achievable gain makes these objects very competitive with other microscope objectives, and the practical results already obtained for beams with dimensions below 100 nm are very exciting: the gain has been improved by almost two orders of magnitude during the last 2 years bringing it now to values of the order of 100.

**References**

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