We address the question: what is the smallest spot size to which an X-ray beam can be focused? We show that confinement of the beam within a narrowly tapered waveguide leads to a theoretical minimum beam size on the order of 10 nm (FWHM), the exact value depending only on the electron density of the confining material. This limit appears to apply to all X-ray focusing devices. Mode mixing and interference can help to achieve this spot size without the need for ultra-small apertures.

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