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(Mysterious) Vertical beam size measurements using in-air X-ray Detector

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An in-air x-ray detector (IXD) is used for vertical beam size measurements at ALBA. The IXD intercepts the residual x-rays (above 120 keV) which are left of the main flux after passing through copper absorbers. These x-rays generate a visible footprint on a sensitive scintillator and are observed by a CCD camera equipped with simple optics with the exposures in the order of 1-10 seconds. This measurement allows evaluation of the original electron beam size; however, at the moment, several unexpected systematic effects are not understood and forbid the reliable application of IXD for ALBA diagnostics. Among these effects are a) enlarged x-ray fan size w.r.t. theoretical value, b) varying (very low) intensity of the residual x-rays if sampled at different but geometrically identical locations of the machine, c) attenuation effect of the absorber “teeth” on the x-ray fan.

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