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Ultrafast Bragg switch for hard X-rays

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We present a time-resolved ultrafast x-ray diffraction experiment with 5-10 ps temporal resolution performed at ID09B beamline at ESRF. The synchrotron hard x-ray pulse with an original duration of 120 ps is shortened by an ultrafast photoacoustic Bragg switch. The short x-ray pulse is used to probe lattice dynamics in a double-layered thin film sample. We discuss in detail the quality and design parameters of the device, such as switching contrast, switching efficiency and structural parameters and analyze changes in Brilliance due to introduction of the Bragg switch into the beamline.

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