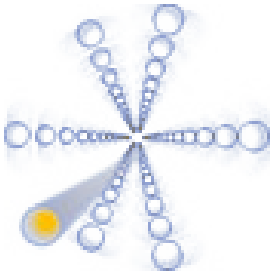

Contribution ID: **110** Type: **Poster**

PS2-18: Modeling and Experimental Investigation of Refractive Short-focus ”(X-ray)-(Acousto)-(X-ray)” Lens for Pulse X-ray Radiation

Tuesday, 7 October 2014 17:00 (1h 30m)

The problem of creation of effective short-focus X-ray optics is discussed. In our works was investigated the problem of effective multiple transformation of pulse X-ray radiation to acoustic shock waves and acoustic shock waves to X-ray radiation at the interfaces of different media (e.g. air and metal) without phase distortion. In our experiments it was found that the impact of shock acoustic waves, which are formed in the air (e.g. during cavitation of water jet or in the result of action of short X-ray pulse) on distant screen leads to the generation of a quasi-coherent directional X-rays from the back side of this screen. The energy of final X-ray depends on the types of atoms on a radiating surface and increases with the charge of atoms from 0.7 keV up to 5 keV for heavy metals. These shock acoustic waves pass the screen volume and, being reflected off the back side, excite the atoms on it. Surface-distributed disturbances from each of the waves are mutually coherent and phased by the action of the shock wave. Spontaneous emission of these mutually phased sources results in generation of X-radiation with large transverse coherence.
Based on these results, it was concluded that there is mutual coherence of successive X-ray and shock acoustic waves, which could participate in a reciprocal transformation at the interfaces of different media. The problem of creation of X-ray lens by implementing an combined “(X-ray)-(Acousto)-(X-ray)” (”XAX”) was studied. We have conducted the series of both theoretical and experimental studies aimed at the creation and study of such metal and ceramic lens.

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