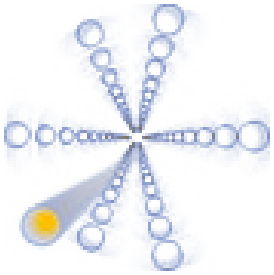

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PS1-27: Abnormal Optical and X-Ray Phenomena at Motion of Fast Water Stream Through Thin Channels

Monday, 6 October 2014 17:00 (1h 30m)

The radiation processes associated with a supersonic liquid jet exhausting from narrow dielectric or metal channels are considered. During researches of different regimes of cavitation we have observed several anomalous radiative phenomena: very intensive optical glow of liquid jet and controlled X-ray radiation. It has been found for the first time that the output of the channel and the initial portion of the jet are sources of intense X-radiation, generation of which is related to cavitation processes in the liquid jet bulk and subsequent excitation of shock waves. The frequency (energy) of X-radiation depends on the types of atoms on a radiating surface (for a jet, it is water; for a channel, the metal atoms on the surface) and increases with the charge of atoms from up to for heavy metals). The total X-ray activity of an experimental setup in the mode of jet exhaust reaches 0.1 Ci.

It has been demonstrated that intense shock waves generated in air near the surface of objects with cavitating water may, during interaction with distant objects (screens), generate not only a secondary shock waves, but also a secondary X-ray waves. These waves are formed in the process of reflection of the secondary shock waves, which are generated in the volume of the screens, off the back surface of these objects. In this process, intense agitation of atoms and the electronic subsystem occurs, which results in the formation of X-ray emission from the back side of the objects. The spatial parameters of this radiation depend on the shape and cross section of the screen and the spatial characteristics of the shock wave.

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