Observation and Investigation of Intensive Directional Quasi-coherent X-Ray Radiation Generated at Interaction of Cavitating Liquid Jet with a Target

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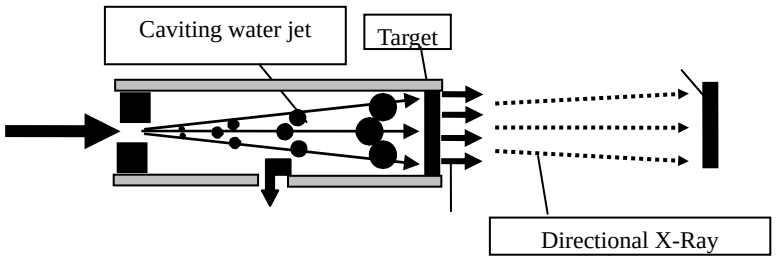
Abstracts: *In the report the results of investigation of intensive directed controlled quasi-coherent controlled X-Ray radiation connected with bubble cavitation phenomena in fast oil jet and supersonic water jet are presented and discussed. be less than 100 word.*

In the report the results of investigation of intensive directed controlled quasi-coherent X-Ray radiation connected with bubble cavitation phenomena and generated at interaction of both fast oil jet and supersonic water jet with different targets [1] are presented and discussed in details. The typical setup for generation of directional X-Ray is shown in Figure. The total activity of X-Ray generation was about Q≥0.1 Ci.



The mechanism of X-Ray generation is connected with the sequential tandem of cavitation and shock-wave processes inside liquid jet, in the volume of output channel and in the volume of target. We have investigated bubble cavitation and X-Ray generation phenomena at high pressures of machine oil (at P=30-90 atm) and at super-high pressures of water (P=200-2000 atm). The soft part of X-Ray radiation with energy E_x=0.8-1.1 keV was generated by the surface of supersonic free water jet in the area of cavitation at any pressure. The energy of radiation from the surface of oil or water output channel (made of plexiglas or stainless steel) was E_x=1.5-2.0 keV. In the case of additional heavy metal cover on outer surface of a target the energy of X-radiation increase up to E_x= 4.5 keV. This radiation has an essential transverse coherence and associated with a mutually phased excitation of surface atoms during action of shock acoustic waves on the outer side of the target [1,2]

It was shown also that the formation of shock waves and X-rays is accompanied by generation of undamped high frequency thermal waves [2].

1. Vysotskii V.I., Kornilova A.A., Vasilenko A.O., Tomak, V.I. *Journal of Surface Investigation X-ray, Synchrotron and Neutron Techniques*, 2014, **#.8**, 1186.
2. Vysotskii V.I., Kornilova A.A. *Current science*, 2015, **v.108**, 114.