Abstract Submitted
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Dynamics of bubble generated by spark discharge in water as a diagnostic tool[1] KAREL KOLACEK, VITALIY STELMASHUK, PETR HOFFER, JIRI SCHMIDT, OLEKSANDR FROLOV, JAROSLAV STRAUS, PETR LUKES, Institute of Plasma Physics CAS — Electrical discharges in liquids have numerous applications. One of them is in water generated shock wave that can be focused and used e.g. for extracorporeal shock wave lithotripsy. Particularly, an application of high-voltage pulse with a fast rise-time to electrodes submerged in water leads to generation of spark discharge with rapidly expanding plasma channel. As a result of this expansion a shock wave is generated and a cavitation bubble is formed. Several theoretical models have been proposed (and summarized by Naugolnych and Roi in "Spark discharges in water") for a simulation of hydrodynamic process initiated by underwater electrical discharge. This contribution will analyse both approaches – based on either incompressible, or compressible liquid assumption. Comparison of simulation results obtained in both approximations with experimental data obtained by a fast frame camera for a set of parameters of the driving electrical circuit helps to determine not only the pressure development in the bubble and its close vicinity, but also the efficiency of transformation of the electrical energy to the mechanical one.

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