

INTERACTION OF HIGH-POWER MICROWAVE BEAMS WITH METAL-DIELECTRIC MEDIA (PHYSICS AND APPLICATIONS)

G.M.Batanov, N.K.Berezhetskaya, I.A.Kosygi*, A.N.Magunov and V.P.Silakov

General Physics Institute of Russian Academy of Sciences, 119991, Vavilov Str. 38, Moscow, Russia

Results of experimental investigation of powerful microwave beams action on the metal-dielectric compositions are presented. Dielectric surfaces with introduced metallic grains as well as dielectric powder containing small admixtures of a metallic one have been explored as an object of irradiation. At a relatively small microwave power ($P \leq 1$ mW) all investigated targets were practically completely transparent for incident electromagnetic wave. At a relatively high power (microwave generators, based on the gyrotrons and powerful magnetrons, $P \geq 100$ kW) the irreversible changes in the electric and radio-physical properties of metal-dielectric composites exposed to microwave radiation whose intensity is below the threshold intensity for plasma production have been observed (sharp increase of conductivity and microwave absorption coefficient). Analysis of received experimental results is presented. Possibilities of observed phenomena application for microwave welding, microwave ceramics sintering, and microwave jet engine realization are discussed.