Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

Microwave Diagnostics of Shock Wave and Detonation Processes ANATOLY MIKHAYLOV, VLADIMIR BELSKY, EVGENY BOGDANOV, ALEXEY RODIONOV, ALEXANDER SEDOV, VLADIMIR KHVOROSTIN, Russian Federal Nuclear Center - VNIIEF 607190, Sarov, Nizhniy Novgorod reg., Russia, RUSSIAN FEDERAL NUCLEAR CENTER - VNIIEF 607190, SAROV, NIZHNIY NOVGOROD REG., RUSSIA TEAM — The physical bases of laser and microwave Doppler interferometry are the same – measurements of the Doppler shift of probing electromagnetic frequency, reflected from a moving surface. However, using probing wavelength 4 orders of magnitude longer, microwave diagnostics has some specific advantages as compared with laser diagnostics, namely: measurements inside the microwave-transparent media, which spectrum is much more wide than the spectrum of optically transparent media; for microwave measurements the reflecting surfaces of media, but all jumps of medium parameters – density, dielectric permittivity, conductivity; for microwave technique due to its wavelength all practically important hydrodynamical jumps are smooth. The results of application of the microwave technique were presented in the paper, which demonstrate capabilities of diagnostics of various dynamic processes using single equipment, namely: liners and massive objects launching; shock-to-detonation transition in HE; propagation of steady detonation waves; laminar HE combustion etc. In all conducted investigations the using of the microwave technique gives a big amount of interesting experimental information which is inaccessible for the other traditional experimental techniques.

Evgeny Bogdanov
Russian Federal Nuclear Center - VNIIEF 607190,
Sarov, Nizhniy Novgorod reg., Russia

Date submitted: 07 Feb 2013 Electronic form version 1.4