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### Millimetre-Wave and Laser NLW: Physics Analysis and Inferences

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The USA has developed the Active Denial System which heats the upper skin layer by 94-GHz millimetre waves at a power density around  $10^4 \text{ W/m}^2$  so that intolerable heat pain is reached after a few seconds. The principal effects have been tested in experiments and described in several scientific articles, weapon details (such as the output power) remain secret. Thermal modelling shows that overheating to 2<sup>nd</sup>- and 3<sup>rd</sup>-degree burns will occur after a few more seconds. Technical limits on exposure are strongly recommended.

Research and development are also done for the Advanced Tactical Laser, a weapon using a chemical oxygen-iodine laser with the goal of 50-70 kW power on a 10 cm focus over many kilometres, and the Pulsed Energy Projectile, a deuterium-fluoride laser for explosive ablation of the uppermost layer of the target subject or object. Physics analysis leads to the conclusion that both are clearly lethal weapons.