# Ablation into water: Fragmentation of metal via Rayleigh–Taylor instability

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Laser ablation of metals in liquid is very different from ablation in vacuum. In contrast to the last the corresponding processes are still poorly understood. We show that to produce metal nanoparticles the laser absorbed energy should few times overcome the ablation threshold for the contact with vacuum. Then the temperature in the heated layer increases above the critical point. Our analysis of the flow as whole with a strong shock propagating in liquid and with a rarefaction wave inside the metal target demonstrates that the contact between metal and liquid, both in their supercritical states, is hydrodynamically unstable. The instability is of the Rayleigh–Taylor type. Its dynamics is important for generation of metal droplets freezing soon into solid nanoparticles.