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Generation of periodic arrangements of matter on materials irradiated by laser fields of uniform and isotropic energy distribution is a key issue in controlling laser structuring processes below the diffractive limit. Using 3D-FDTD methods, we evaluate energy deposition patterns below a material's rough surface and in bulk dielectric materials containing randomly distributed nano-inhomogeneities. We show that both surface and volume patterns can be attributed to spatially ordered electromagnetic solutions of linear and nonlinear Maxwell equations. Transient electronic response is also analyzed and show that for nonplasmonic metals, ultrafast carrier excitation can drastically affect electronic structures, driving a transient surface plasmonic state.