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**Ultrafast dynamics of plasma microclouds induced by strong-field ionization in atomic and molecular gases** RYAN COMPTON, ALEX FILIN, DMITRI ROMANOV, ROBERT LEVIS, Department of Chemistry, Department of Physics, and Center for Advanced Photonics Research, Temple University, Philadelphia PA 19122 — The model presented for the ultrafast dynamics of laser-induced plasma channels reveals the connections among the fundamental processes of laser-induced tunnel ionization, plasma cooling dynamics of the produced plasma channel, and the residual fluorescence of the channel. The results obtained link the dynamic behavior of the underdense plasma formation with the internal degrees of freedom of the constituent species suggesting that related processes of much current interest, such as laser induced breakdown, laser induced ablation, and, further, atmospheric filamentation will depend sensitively on atomic and molecular constituents. This opens the way to optimizing plasma channel characteristics (bandwidth, coherence, brightness) to that desired for a particular experiment.

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