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Femtosecond laser filamentation with different atmospheric pressure gradients

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Abstract

Filamentation processes with different atmospheric pressure gradients are investigated numerically both in spatial and temporal regimes. The filamentation position and length are very sensitive to the pressure gradient. With the positive pressure gradient from low pressure to the standard pressure, the plasma density may still keep increasing with the intensity decreasing. The temporal profiles are also influenced by the pressure gradients dramatically. For supercontinuum (SC) emission, the red shift is dominated by the average atmospheric pressure while the blue shift is enhanced in the low pressure. Moreover, the positive pressure gradient is slightly good for the blue shift.

Keywords: filamentation, air, pressure gradient, self-focusing.

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