Extreme UV Light Generation Through Dispersive Wave Trapping in a Tapered Gas-Filled Hollow Fiber

In this letter, we demonstrate how the soliton–plasma interaction initiates trapping of the generated dispersive waves (DWs) in an experimentally feasible tapered He-filled hollow-core anti-resonant fiber (HC-ARF). We show that the taper gradient strongly influences the pulse trapping dynamics and thus determines the intensity and blueshift of the trapped DW. This process leads to an efficient DW generation down to 100 nm with a 3.4-octave supercontinuum spanning 100–1150 nm (2.73 PHz) by tapering a 36-μm core HC-ARF to 18 μm under 19-bar He, pumped at 800 nm with 6-μJ pulse energy. The proposed fiber taper structure could be an alternative route to generate light in the extreme ultra-violet (EUV) spectral range using moderate gas pressure and relatively low pulse energy.

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