Generation of supercontinuum during filamentation of femtosecond laser pulses in water.

Diploma thesis abstract

In present work I conducted numerical and experimental investigation of supercontinuum emission spectrum during filamentation of femtosecond laser pulses in water at different wave lengths, particularly at 640, 800, 1300 and 2300nm. Much attention was spent to studying of conical emission frequency-angular spectrum formation along lengthy filament formed by pulse of constant parameters.

It was proved that during filamentation of femtosecond laser pulses in water frequency-angular spectrum undergoes considerable transformation. It was shown that when laser pulse breaks into subpulses final frequency-angular spectrum is formed as a result of supercontinuum emission interference from subpulses. Under these conditions interference pattern superimposes frequency-angular spectrum of the pulse. Structure of the spectrum to a considerable degree is determined by material dispersion of media. In case of normal dispersion frequency-angular spectrum takes X-like form, in case of zero dispersion - Fish-like form, in case of anomalous dispersion - O-like form in coordinates $(\theta, \lambda)$.

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