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Filament propagation length of femtosecond pulses with Gaussian and Bessel-Gaussian modes NECATI KAYA, MUHAMMED SAYRAC, GAMZE KAYA, YAKUP BORAN, Texas A&M Univ, JAMES STROHABER, Florida A&M University, ALEXANDRE KOLOMENSKII, HANS SCHUESSLER, Texas A&M Univ — We experimentally studied intense femtosecond pulse filamentation and propagation in water for Gaussian and Bessel-Gaussian incident beams. The transverse modes for incident laser pulses were created from a Gaussian beam of a Ti:sapphire laser system by using a computer generated hologram technique. We found that the length of the filament induced by the Bessel-Gaussian incident beam was longer than that for the Gaussian transverse mode under the conditions of the same peak intensity, pulse duration, and the size of the central part of the beam. To better understand the Bessel-Gaussian beam propagation, we performed a more detailed study of the filament length as a function of the number of radial modal lobes. The length increased with the number of lobes, implying that the radial modal lobes serve as an energy reservoir for the filaments formed by the central intensity peak. This work was supported by the Robert A. Welch Foundation Grant No. A1546 and the Qatar Foundation under the grant NPRP 6 - 465 - 1 - 091.

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