Multimode supercontinuum generation in chalcogenide glass fibres

Mid-infrared supercontinuum generation is considered in chalcogenide fibres when taking into account both polarisations and the necessary higher order modes. In particular we focus on high pulse energy supercontinuum generation with long pump pulses. The modeling indicates that when only a single polarisation in the fundamental mode is considered the obtainable supercontinuum bandwidth is substantially exaggerated compared to when both polarisations are taken into account. Our modeling shows that if the pump pulse is short enough (≤10ps) then higher order modes are not important because of temporal walk-off. In contrast long pump pulses (≥40ps) will efficiently excite higher order modes through Raman scattering, which will deplete the fundamental mode of energy and limit the possibility of obtaining a broadband supercontinuum.

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