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Onset of ice VII phase during ps laser pulse propagation through liquid water¹ PREM KIRAN PATURI², RAKESH KUMAR VADDAPALLY, ACRHEM, University of Hyderabad, ACRHEM TEAM — Water dominantly present in liquid state on earth gets transformed to crystalline polymorphs under different dynamic loading conditions. Out of 15 different crystalline phases discovered till date, ice VII is observed to be stable over wide pressure (2-63 GPa) and temperature (>273 K) ranges. We present the onset of ice VII phase at low threshold of 2 mJ/pulse during 30 ps (532 nm, 10 Hz) laser pulse induced shock propagating through liquid water. Role of input pulse energy on the evolution of Stoke's and anti-Stoke's Raman shift of the dominant A_{1g} mode of ice VII, filamentation, free-electrons, plasma shielding is presented. The H-bond network rearrangement, electron ion energy transfer time coinciding with the excitation pulse duration supported by the filamentation and plasma shielding of the ps laser pulses reduced the threshold of ice VII structure formation. Filamentation and the plasma shielding have shown the localized creation and sustenance of ice VII structure in liquid water over 3 mm length and 50 μm area of cross-section.

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