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The numerical study of nonlinear instabilities in ICF plasmas CHUNYANG ZHENG, LIANG HAO, ZHANJUN LIU, Institue of Applied Physics of Computational Mathematics, Beijing — Convective Raman or Brillouin amplification and competition between them in inhomogeneous, drifting plasmas are discussed. Based on a five-wave model, relations of the backscattering reflectivity between Raman and Brillouin are deduced, and the influence of inhomogeneity, drift, damping to the pattern of competition is analyzed. For the given plasma conditions and noise source, the backscatter spectrum can be constructed. Recent gas-filled hohlraum experiments at the SHEN-GUANG laser facility show good agreement between measured reflectivity and our model predictions. The features of side-scatter in overlapping laser beams are also studied. We observe that backward Raman scattering level of one pump beam can be significantly enhanced when the second beam crosses it. This can be explained as the induced stimulated Raman side scattering, and the scattering wave of the first beam is as the seed light of the second beam. The variance of Raman scattering level with the different crossing angles is investigated. An extended five-wave model including nonlinear damping and detuning of plasma wave is under consideration.

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