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**Size distribution of microclusters in laser-irradiated plasmas**

ALEXEY AREFIEV, BORIS BREIZMAN, MIKHAIL TUSHENTSOV, Institute for Fusion Studies, The University of Texas at Austin — Laser interactions with a mixture of a gaseous plasma and microclusters depend strongly on the cluster-size distribution, which is usually difficult to measure. We present a concept for recovering this distribution from measurements of a time-dependent refraction index of the medium. The underlying idea is that the absorbed power in a pump-probe experiment, measured as a function of the delay between the pulses, carries information about the cluster-size distribution. The absorption in a single cluster is due to the plasma resonance at the critical density and the power absorption for a given cluster size can be obtained by rescaling the results for a benchmark case. The time-dependent power absorption for a medium with a given cluster-size distribution is then a convolution of the size-distribution and the rescaled absorption curve. This relation can be inverted to recover the cluster distribution from the experimentally measured absorption. We demonstrate feasibility of this technique by analyzing the data from recent pump-probe experiments at the University of Texas.

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