

Abstract Submitted  
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**Study the fragment size distribution in dynamic fragmentation of laser shock loading tin.** WEIHUA HE, JIANTING XIN, GENBAI CHU, MIN SHUI, TAO XI, YONGQIANG ZHAO, YUQIU GU, Research Center of Laser Fusion, China Academy of Engineering Physics — Characterizing the distribution of fragment size produced from dynamic fragmentation process is very important for fundamental science like predicting material dynamic response performance and for a variety of engineering applications. However, only a few data about fragment mass or size have been obtained due to its great challenge in its dynamic measurement. This paper would focus on investigating the fragment size distribution from the dynamic fragmentation of laser shock-loaded metal. Material ejection of tin sample with wedge shape groove in the free surface is collected with soft recovery technique. Via fine post-shot analysis techniques including X-ray micro-tomography and the improved watershed method, it is found that fragments can be well detected. To characterize their size distributions, a random geometric statistics method based on Poisson mixtures was derived for dynamic heterogeneous fragmentation problem, which leads to a linear combinational exponential distribution. Finally we examined the size distribution of laser shock-loaded tin with the derived model, and provided comparisons with other state-of-art models. The resulting comparisons prove that our proposed model can provide more reasonable fitting result for laser shock-loaded metal.

Weihua He  
Research Center of Laser Fusion, China Academy of Engineering Physics

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