

Abstract Submitted  
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**A Combined Discrete/Finite Element Multiscale Numerical Method and Its Application to Structure Failure Simulation under Laser Irradiation**<sup>1</sup> JIANLONG XU, ZHIPING TANG, University of Science and Technology of China — Analysis of a variety of engineering problems requires computation at different length scales. A combined discrete/finite element numerical method is proposed and developed in this paper to meet this requirement. This method performs discrete element method at meso-scale to reach necessary precision, and finite element method at macro-scale to save the computation time and cost. The key point for this method is to define a special transition layer between discrete element zone and the finite element zone. We apply this new method to simulate the failure responses of a pre-stressed aluminum plate and a cylindrical shell with inner pressure under laser irradiation with the combination codes of DM3 (a 3D Discrete Meso-Element Dynamic Method)/plane FEM and DM3/shell FEM developed in this lab, respectively. It finds good agreement between the current computational results and the reported results in the references.

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Zhiping Tang  
University of Science and Technology of China

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