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**Towards Predicting a Microstructure's Susceptibility to Spall**

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Understanding and predicting the response of materials under dynamic loading is a challenging problem due to complexities involved with the loading state and its interaction with various features in the microstructure. Previous experiments to study dynamic fracture in Tantalum (Ta) manufactured via Additive manufacturing (AM) has shown differences not only in the elastic plastic transition but also its spall properties. The goal of this work is to understand this difference in the dynamic response of AM vs. wrought Ta through the use of non-equilibrium molecular dynamics (MD) simulation. Both experiments and simulation data showed that altering the processing conditions also changed the number fraction of specific grain boundary types in the wrought and AM materials. To investigate if this change in boundary type distribution is the main cause of differences in the dynamic response of these materials, bi-crystal simulations were performed to quantify the effect of boundary type and structure on spall strength.

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