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A new cavitation and spall criterion derived from probabilistics aspects of dynamic degradation in ductile materials. Application to tantalum spall behaviour. GILLES ROY, CEA Valduc, France, FRANCOIS HILD, LMT, ENS Cachan, France, HERVE TRUMEL, CEA Le Ripault, France, YVES-PATRICK PELLEGRINI, CEA IIe de France, France, CEA VALDUC, IS SUR TILLE, FRANCE TEAM, LMT, ENS CACHAN, FRANCE TEAM, CEA LE RI-PAULT, MONTS, FRANCE TEAM, CEA ILE DE FRANCE, BRUYERES LE CHATEL, FRANCE TEAM — Dynamic loadings produce high stress waves leading to the spallation of ductile materials such as aluminium, copper, magnesium or tantalum. The main mechanism used to explain the change in the number of cavities with stress rate is a nucleation inhibition induced by the growth of cavities already nucleated [F. Hild et al., to be submitted to J. App. Phys., 2007]. The dependence of the spall strength and critical time with the loading rate is investigated. The present approach is applied to analyse experimental data on a high purity tantalum grade.

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