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The transit to detonation in high explosives NEIL BOURNE, DAVID EASTWOOD, SEBASTIAN MARUSSI, University of Manchester, GARY PARKER, PETER DICKSON, Los Alamos National Laboratory, ROBERT ATWOOD, THOMAS CONNELLY, Diamond Light Source Ltd., DOUG WAGSTAFF, ANNA MARTINEZ, Health and Safety Executive, UOMAH COLLABORATION, LANL COLLABORATION, DLS COLLABORATION, HSE COLLABORATION
— Accidents with explosive materials are still too common after 100 years of using them. The manner by which they transit from burn to detonation (DDT) after a random thermal event, such as an electrical arc or by friction if a package is dropped, is by far the single biggest risk associated with explosives storage and use but is a particularly difficult process to observe and quantify. Thus there are no verified theoretical frameworks for the process and no useful predictive modelling capabilities. Recent experiments conducted at the Diamond Synchrotron have yielded groundbreaking, time-resolved observations of DDT for the first time. Initial analysis has shown that this opens a new area of opportunity for fast imaging at synchrotrons. The work has opened a window on critical processes that occur within burn to detonation providing a new framework for understanding how to handle the materials more safely.

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