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The Fukushima Nuclear Power Plant Explosions, the Accident and Underlining Physics

par

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salle de réunion ICARE



On March 11, 2011 a magnitude 9 earthquake, centered off the east coast of Japan, abruptly affected the renaissance of nuclear power generation across the world. The earthquake produced a 14 meter high tsunami that crippled the Fukushima Dai-ichi nuclear power plant. The sequence of events triggered by the earthquake led to reactor core degradation, hydrogen generation and explosions involving three of the units. The two visible large-scale explosions, in Units 1 and 3, left a lasting impression on the general public concerning nuclear safety. The internal explosion in Unit 2 is most likely responsible for the radioactive water that continues to leak out of the plant to this day, 3 years after the start of the accident, contaminating the surrounding ground and sea water. A brief description of the failure of the various power plant safety systems during the accident will be given followed by a discussion of what we know about hydrogen explosions. The research performed at Queen's University, Canada over the last 15 years dealing with gas-phase explosions will be reviewed. The presentation will be a high-level overview of the gasdynamic and chemical mechanisms involved in flame acceleration and supersonic combustion wave propagation in an obstructed channel. High-speed, high-resolution schlieren video shows that shock wave reflection plays the primary role in the later-stage of flame acceleration and deflagration-to-detonation transition.

Prochain séminaire prévu 17/07/2014, 11h : *Experimental and kinetic modelling of trans-2-butene oxidation in jet-stirred reactor and combustion bomb*, par Yann FENARD, doctorant à ICARE

Pour tout renseignement complémentaire, ou proposition de séminaire par un thésard ou un chercheur invité, contacter Ivan Fedioun, fedioun@cnrs-orleans.fr, poste 5520, 06.62.81.23.08