

# **Current State of Research on Pressurized Water Reactor Safety**

Jean Couturier, Michel Schwarz



**Cover illustrations:** photographs showing research and development in pressurized water reactor safety at IRSN. From left to right: the hydrogen risk in nuclear reactors © IRSN [Institut Icare](#); image from a 3D simulation by the [MC3D](#) code of corium dispersion in the water in a reactor pit in the event of a central reactor vessel failure © IRSN; states of degradation of fuel assemblies from the [Phébus-PF](#) program © IRSN; a prototype of the conformable transducer – IRSN/CEA patent © IRSN/CEA (bottom); Phébus-LOCA – section view (post-mortem) of a test fuel cluster following a temperature transient typical of a LOCA © IRSN (top); an experiment involving a fire in a stack of cable raceways © Florent-Frédéric Vigroux/IRSN (bottom); 2D model of the Nice basin; below, amplification of seismic waves calculated by a numerical simulation of seismic wave propagation in this model © Fabien Peyrusse/[Inria](#); fire test on electrical cables © Florent-Frédéric Vigroux/IRSN (bottom).

Printed in France

ISBN (print): 978-2-7598-2164-8 – ISBN (ebook): 978-2-7598-2165-5

DOI: 10.1051/978-2-7598-2164-8

All rights relative to translation, adaptation and reproduction by any means whatsoever are reserved, worldwide. In accordance with the terms of paragraphs 2 and 3 of Article 41 of the French Act dated March 11, 1957, “copies or reproductions reserved strictly for private use and not intended for collective use” and, on the other hand, analyses and short quotations for example or illustrative purposes, are allowed. Otherwise, “any representation or reproduction - whether in full or in part – without the consent of the author or of his successors or assigns, is unlawful” (Article 40, paragraph 1). Any representation or reproduction, by any means whatsoever, will therefore be deemed an infringement of copyright punishable under Articles 425 and following of the French Penal Code.