Resume:

Dr Thierry Poinsot is a research director at CNRS, head of the CFD group at CERFACS, senior research fellow at Stanford University, consultant for various companies and member of the French Academy of Sciences. His group has produced a significant part of recent research in the field of theory and LES for turbulent combustion. He teaches numerical methods and combustion in many schools and universities worldwide. He has authored more than 220 papers in refereed journals and 200 communications and is the author of the textbook  "Theoretical and numerical combustion" with Dr D. Veynante and the editor in chief of «Combustion and Flame » with Pr F. Egolfopoulos. He has received numerous academic awards, a first ERC advanced grant in 2013 on thermoacoustics and a second one in 2019 on hydrogen combustion for energy storage.

Abstract:

While combustion of fossil fuels is obviously a main cause for global warming, combustion may actually also be a significant part of the solution to this problem: going to renewable energies will be impossible if new, massive capacities for energy storage are not developed. This is exactly what hydrogen solutions can bring through the development of Power to X solutions where H2 is produced from renewable energies, stored in large quantities for long periods of time before being burnt when needed, alone or mixed with other fuels: combustion becomes a method to store and recover the energy of renewable sources.

Such technologies require significant advances in combustion science, in terms of kinetics and flame structures (burning for example hydrogen mixed with other types of gaseous or liquid fuels), explosion safety, flame control, burner design (to provide fuel flexibility). This talk will summarize the context for H2 development and provide first simple examples of recent developments performed during the ERC advanced grant SCIROCCO which started in Toulouse in 2020 (cerfacs.fr/scirocco).