



**POLITECNICO
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MOX Seminar Series

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Numerical simulations of non-ideal compressible-fluid flows

30 November 2017, 2:00 pm

Aula Consiglio VII Piano - Edificio 14, Dipartimento di Matematica POLITECNICO DI MILANO.

Abstract:

In the close proximity of the liquid-vapour saturation curve and critical point, well-known thermodynamic phenomena including large compressibility and critical point effects results in very unusual fluid dynamics features, including non-ideal or rarefaction shock waves, mixed and split waves. This unconventional behaviour, which cannot occur in the ideal flow of dilute gases, is referred to as Non-Ideal Compressible-Fluid Dynamics or NICFD. The focus of this short lecture is to review the theoretical background of NICFD and to discuss the impact of highly non-ideal conditions on the design and properties of numerical schemes for compressible flows. Exemplary flow fields will be presented and compared to available experimental data from the Test-Rig for Organic VAPours (TROVA) of Politecnico di Milano, a unique facility in which supersonic flows in non-ideal conditions can be measured and observed. The present results are obtained within the framework of the ERC Consolidator Grant NSHOCK, of which the presenter is the PI.

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Alberto Guardone:

Prof. Alberto Guardone's research interests include the theoretical, numerical and experimental investigation of non-ideal compressible-fluid dynamics (NICFD). In particular, he is interested in the observation of so-called non-classical gas dynamics wave-fields in the vapour phase of complex organic compounds and in the near-critical region of pure, common substances. He is the coordinator of the Laboratory of Compressible-fluid dynamics for Renewable Energy Applications (CREA, crealab.polimi.it). He is the recipient of a ERC Consolidator Grant 2013, aimed at performing unique measurements of NCIFD flows in the Test-Rig for Organic Vapours (TROVA) facility in Milano. He is contributing as co-PI to two Marie Skłodowska-Curie networks, the Joint European Doctorate NITROS (nitros-edj.eu) and the Training Network UTOPIAE (utopia.eu), in the field of in-flight icing prediction.