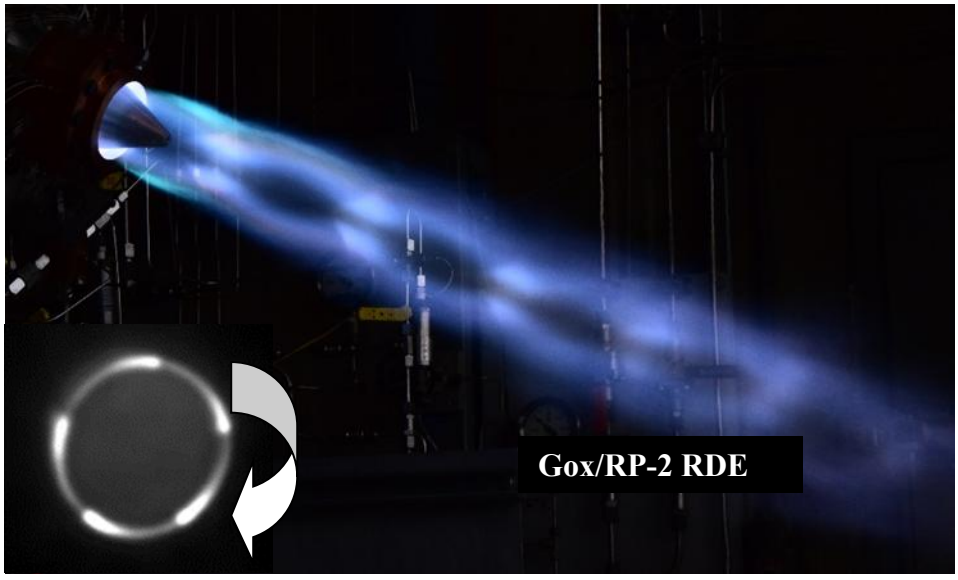
AVVISO DI SEMINARIO
GIOVEDI' 14 MAGGIO 2026 – ORE 15:00
Facoltà di Ingegneria Civile e Industriale – Aula 8

Progress in Development of Rotating Detonation Rocket Engines

S. Heister, School of Aeronautics and Astronautics, Purdue University

The global propulsion community appears to be rapidly advancing rotating detonation combustion technology for both airbreathing and rocket applications. In contrast to conventional combustors that burn propellants in deflagration fashion at nearly constant pressure conditions, rotating detonation engines (RDEs) consume propellants behind a detonation wave moving at roughly 1-2 km/s around the annular chamber. This incredible rate of propellant consumption affords chambers that are an order of magnitude smaller in volume than conventional variants. In addition to the volumetric benefits, theoretical specific impulse gains of the order of 5-10% have been estimated albeit with lower order models. Progress toward achieving these gains and an assessment of the current state-of-the-art in the technology will be presented in the lecture.



Stephen Heister is the Raisbeck Distinguished Professor Emeritus in the Department of Aeronautics and Astronautics. Professor Heister earned a B.S./M.S. degrees from the University of Michigan and a Ph.D. from UCLA in the Aerospace Engineering field. He has work experience at Lockheed California Company and The Aerospace Corporation where he spent the bulk of the 1980's. He also has spent time at TRW (1997) and Blue Origin (2016) as part of sabbatical visits. Prof. Heister has published extensively in the areas of chemical rocket and airbreathing combustion, atomization and fuel/propellant injection, injection dynamics, and system-level studies of aerospace vehicle concepts (including detonation-based propulsion).

From 2011-2016, Dr. Heister served as Director of the Maurice J. Zucrow Labs, a seven-building complex west of Purdue's main campus with substantial capabilities to study high pressure combustion/propulsion at relevant conditions. He served on the Air Force Scientific Advisory Board from 2011-2014. Dr. Heister has received numerous honors and awards including AIAA Fellow, Purdue University Faculty Scholar, and five-time winner of the E. F. Bruhn Teaching Award for the School of Aeronautics and Astronautics. Prior to retirement in 2025, Professor Heister advised over 100 Purdue graduate students, most of whom are leading advancement of aerospace propulsion.

Università degli Studi di Roma "La Sapienza"
Centro di Ricerca Aerospaziale Sapienza
CF 80209930587. PI 02133771002
Via Eudossiana 18 00184 Roma, Italia, Tel. (+39) 06 44585915
sito web: https://cras.web.uniroma1.it/