

The 4th European sCO₂ Conference for Energy Systems – March 23rd & 24th, 2021

Conference address: Online Conference



Tuesday – March 23 rd		
Audience hall		
09:00 – 09:15	Introduction <i>Dieter Brillert</i>	
09:15 – 09:45	Keynote Speech <i>Angelos Kokkinos - Office of Advanced Fossil Technology Systems, U.S. Department of Energy</i>	
09:45 – 10:15	Coffee break	
	Turbomachines and Cycles - Session 1 Room 1 Chairman: Giuseppe Bianchi, Brunel University London	sCO₂ Applications and Energy Systems - Session 1 Room 2 Chairman: Andreas Werner, TU Wien
10:15 – 10:45	Numerical Analysis of a Centrifugal Compressor Operating With Supercritical CO ₂ <i>Renan Emre Karaefe; Pascal Post; Marwick Sembritzky; Andreas Schramm; Matthias Kunick; Uwe Gampe; Francesca di Mare</i>	Transient Analysis of the Super-critical Carbon Dioxide Cycle Coupled to Pressurized Water Reactor for Nuclear Powered Ships <i>Jeong Yeol Baek; Jae Jun Lee; Jeong Ik Lee</i>
10:45 – 11:15	Operational Analysis of a Self-Propelling Heat Removal System Using Supercritical CO ₂ with ATHLET <i>Markus Andreas Hofer; Michael Buck; Jörg Starflinger</i>	The Development of a New Chemical Kinetic Mechanism for Combustion in Supercritical Carbon Dioxide <i>James Michael Harman-Thomas; Kevin Hughes; Mohamed Pourkashanian</i>
11:15 – 11:45	Design considerations of sCO ₂ turbines developed within the CARBOSOLA project <i>Stefan Glos; Patrik Rene Lippe; Simon Kobler; Michael Wechsung</i>	sCO ₂ power cycle design without heat source limitations: Solar thermal particle technology in the CARBOSOLA project <i>Lukas Heller; Stefan Glos; Reiner Buck</i>
11:45 – 12:15	Simulation and Analysis of a Self-Propelling Heat Removal System Using Supercritical CO ₂ at Different Ambient Temperatures <i>Markus Hofer; Haikun Ren; Frieder Hecker; Michael Buck; Dieter Brillert; Jörg Starflinger</i>	Analysis of sCO ₂ Cycles for District Heating Applications <i>Mathias Penkuhn; George Tsatsaronis</i>
12:15 – 13:15	Lunch	
	sCO₂ Experiments and Loops - Session 1 Room 1 Chairman: Václav Dostál, Czech Technical University in Prague	sCO₂ Applications and Energy Systems - Session 2 Room 2 Chairman: Andreas Werner, TU Wien
13:15 – 13:45	Closed-Loop Supercritical Carbon Dioxide Wind Tunnel: Design and Components <i>Giuseppe Petruccelli; Antti Uusitalo; Aki Grönman; Teemu Turunen-Saaresti; Marta Zocca</i>	Environmental assessment of a 25 MWe fossil fired supercritical CO ₂ cycle <i>Victor Maquart; Benoit Valentin; Albannie Cagnac</i>
13:45 – 14:15	Experimental investigations on the heat transfer characteristics of supercritical CO ₂ in heated horizontal pipes <i>Konstantinos Theologou; Rainer Mertz; Eckart Laurien; Jörg Starflinger</i>	Greening a Cement Plant Using sCO ₂ Power Cycle <i>Ladislav Vesely; Prabu Thangavel; S. Gopinathan; Frybort Otakar; Ganesan Subbaraman; Jayanta Kapat</i>
14:15 – 14:45	Sofia – sCO ₂ facility for Supercritical Brayton Cycle Research <i>Otakar Frybort; Karel Dockal; Petr Hajek; Tomas Melichar; Petr Vlcek; Vilem Hanzal; Petr Hajek; Antonin Zivny; Marek Paty; Ales Macalka; Miroslav Kapic</i>	sCO ₂ Power Cycle Development and STEP Demo Pilot Project <i>Brian Lariviere; Scott Macadam; Michael McDowell; Markus Lesemann; John Marion</i>

The 4th European sCO₂ Conference for Energy Systems – March 23rd & 24th, 2021

Conference address: Online Conference



Tuesday – March 23 rd		
14:45 – 15:15	Design and Specification of a 10MW-Class sCO ₂ Compressor Test Facility <i>Jeongseek Kang; Alexander Vorobiev; Joshua Cameron; Scott Morris; Ryan Wackerly; Kyle Sedlacko; Jason Miller; Timothy Held</i>	Adiabatic Compressed CO ₂ Energy Storage <i>Matteo Manzoni; Alberto Patti; Simone Maccarini; Alberto Traverso</i>
15:15 – 15:30	Keynote Speech Q&A <i>Angelos Kokkinos - Office of Advanced Fossil Technology Systems, U.S. Department of Energy</i>	
15:30 – 16:00	Coffee break	
	Heat Exchanger and Transfer - Session 1 Room 1 Chairman: Martin Rohde, Technische Universiteit Delft	Fluid and Material Aspects - Session 1 Room 2 Chairman: Uwe Gampe, Technische Universität Dresden
16:00 – 16:30	Characterizing and modelling turbulence in supercritical fluids <i>Rene Pecnik; Jie Ren; Gustavo Otero Rodriguez</i>	Study of the Influence of Additives to CO ₂ on Performance Parameters of a sCO ₂ -Cycle <i>Sebastian Rath; Erik Mickoleit; Cornelia Breikopf; Uwe Gampe; Andreas Jäger</i>
16:30 – 17:00	Numerical dimensioning of a pre-cooler for sCO ₂ power cycles to utilize industrial waste heat <i>Sebastian Unger; Jonas Müller; Malini Bangalore Mohankumar; Sebastian Rath; Uwe Hampel</i>	Thermal efficiency gains enabled by using supercritical CO ₂ mixtures in Concentrated Solar Power applications <i>Francesco Crespi; Pablo Rodríguez-de Arriba; David Sánchez; Abubakr Ayub; Gioele Di Marcoberardino; Costante Invernizzi; Gonzalo S. Martínez; Paolo Iora; Daniele Di Bona; Marco Binotti; Giampaolo Manzolini</i>
17:00 – 17:30	Conceptual Design, Optimisation and Qualification of Highly Efficient Brazed Plates and Fins Heat Exchangers for Heat Removal sCO ₂ Brayton Cycle to Increase the Safety of Nuclear Power Plants <i>Sarah Tioual-Demange; Vivien Voirin; Markus Hofer; Frieder Hecker; Michael Buck; Jörg Starflinger</i>	Investigation of material degradation and coolant chemistry for sCO ₂ power cycles <i>Jan Berka; Tomas Hlincik; Eliska Purkarova; Alice Vagenknechtova; Lucia Rozumova</i>
Wednesday – March 24 th		
	Turbomachines and Cycles - Session 2 Room 1 Chairman: Teemu Turunen-Saaresti, Lappeenranta University of Technology	Turbomachines and Cycles & Fluid and Material Aspects - Session 2 Room 2 Chairman: Uwe Gampe, Technische Universität Dresden
09:00 – 09:30	An Attempt for Establishing Pressure Ratio Performance Maps for Supercritical Carbon Dioxide Compressors in Power Applications <i>Ihab Abd El Hussein; Sebastian Schuster; Dieter Brillert</i>	Preliminary Aerodynamic Design of a Supercritical Carbon Dioxide Compressor Impeller for Waste Heat Recovery Applications <i>Shantanu Thada; A M Pradeep; Arunkumar Sridharan</i>
09:30 – 10:00	Numerical Investigation Of A Simple Regenerative Heat To Power System With Coupled Or Independent Turbomachinery Drives <i>Matteo Marchionni; Giuseppe Bianchi; Muhammad Usman; Apostolos Pesyridis; Savvas Tassou</i>	Microstructural Evaluation of Preselected Steels for Turbine after Supercritical CO ₂ Exposure <i>Lucia Rozumova; Tomáš Melichar; Ladislav Velebil</i>
10:00 – 10:30	Effect of the ambient temperature on the performance of small size sCO ₂ based pulverized coal power plants <i>Dario Alfani; Marco Astolfi; Marco Binotti; Paolo Silva</i>	Advanced Thermodynamic Power Cycles Utilizing Carbon Dioxide Based Mixtures as Working Fluids for High Temperature Waste Heat Recovery <i>Abubakr Ayub; Gioele di Marcoberardino; Costante Mario Invernizzi; Paolo Iora</i>

The 4th European sCO₂ Conference for Energy Systems – March 23rd & 24th, 2021

Conference address: Online Conference



Wednesday – March 24th		
10:30 – 11:00	Coffee break	
	Heat Exchanger and Transfer - Session 2 Room 1 Chairman: Jörg Starflinger, University Stuttgart	sCO₂ Applications and Energy Systems - Session 3 Room 2 Chairman: Albannie Cagnac, EDF
11:00 – 11:30	Modeling and Study of a Printed Circuit Heat Exchanger for Brayton Power Cycles Using Supercritical CO ₂ Mixtures as Working Fluid <i>Robert Valencia-Chapi; Olmo Fierros-Peraza; Luis Coco-Enríquez; Javier Muñoz-Antón</i>	Thermal design of latent heat thermal energy storage facility with supercritical CO ₂ <i>Tomas Melichar; Karel Dockal; Otakar Frybort; Petr Hajek</i>
11:30 – 12:00	Evaluation of deterioration in vertical sCO ₂ cooling heat transfer in 3 mm tube <i>Andreas Wahl; Rainer Mertz; Eckard Laurien; Starflinger Joerg</i>	Utilizing Industrial Waste Heat for Power Generation Using sCO ₂ Cycles <i>Hady Ramez Soliman; Björn Thorsson; Silvia Trevisan; Rafael Eduardo Guédez</i>
12:00 – 13:00	Lunch	
	Turbomachines and Cycles - Session 3 Room 1 Chairman: Stefan Glos, Siemens Energy AG	sCO₂ Applications and Energy Systems - Session 4 Room 2 Chairman: Otakar Frýbort, Centrum Vyzkumu Rez
13:00 – 13:30	Binary interaction parameter uncertainty in the optimisation of a transcritical cycle: Consequences on turbine design <i>Omar Aqel; Martin White; Abdunaser Sayma</i>	Optimal design of supercritical CO ₂ (S-CO ₂) cycle systems for internal combustion engine (ICE) waste-heat recovery considering heat source fluctuations <i>Jian Song; Yaxiong Wang; Jiangfeng Wang; Christos Markides</i>
13:30 – 14:00	Mean-Line Analysis of Supercritical CO ₂ Centrifugal Compressors by Using Enthalpy Loss Coefficients <i>Haikun Ren; Alexander Johannes Hacks; Sebastian Schuster; Dieter Brillert</i>	Techno-economic optimization method and its application to a sCO ₂ gas turbine bottoming cycle <i>Thiago Correa Veloso Gotelip; Uwe Gampe; Stefan Glos</i>
14:00 – 14:30	Exergoeconomic Analysis of Hybrid sCO ₂ Brayton Power Cycle <i>Abdurrahman Alenezi; Ladislav Vesely; Jayanta Kapat</i>	Estimated Cost and Performance of a Novel sCO ₂ Natural Convection Cycle for Low-grade Waste Heat Recovery <i>Kelsi Katcher; Michael Marshall; Natalie Smith; Cole Replogle</i>
14:30 – 15:00	Design and off-design analysis of a highly loaded centrifugal compressor for sCO ₂ applications operating in near-critical conditions <i>Alessandro Romei; Paolo Gaetani; Giacomo Persico</i>	Experiences of supercritical CO ₂ applications in refrigeration and air conditioning systems <i>Christian Doerffel; Christiane Thomas; Ullrich Hesse</i>
15:00 – 15:15	Closing Session	