

FIFTH COLLOQUIUM CAVITATION AND CAVITATION EROSION

05./06. NOVEMBER 2024

PROGRAM

As at: 23.08.2024

Prof. Dr.-Ing. Romuald Skoda,
Hydraulische Strömungs-
maschinen (HSM),
Ruhr-Universität Bochum



Prof. Dr.-Ing. Michael Pohl
Werkstoffprüfung (WP)
Ruhr-Universität Bochum



Prof. Dr.-Ing. Bettar Ould el Moctar
Schiffstechnik, Meerestechnik,
Transportsysteme (ISMT),
Universität Duisburg-Essen



ACCOMMODATION

Room contingents have been reserved for the night of 05.11. to 06.11.2024, as well as for two nights from 04.11.2024. You can register at the following hotels up to and including 24.09.2024 under the keyword „Kavitation“:

Moxy Bochum

ASHG Bochum OpCo GmbH
Stadionring 18
44791 Bochum
Tel.: +49 234 6101 115
Events.bochum@ashg.eu
Price category: Single room from 79,00 EUR

H+ Hotel Bochum

Curator Hotelbetriebsges. Ruhrgebiet GmbH
Stadionring 22
44791 Bochum
Tel.: +49 234 92566 511
ReservierungBO@h-hotels.com
Price category: Single room from 89,00 EUR

Both hotels are within walking distance of public transportation to the Veranstaltungszentrum Ruhr-Universität Bochum.

REGISTRATION

Please register via email with the subject *Kavitation2024* to the HSM secretariat (hydro@rub.de).

DATES

01.08.2024 Registration deadline for presentations
15.08.2024 Publication program
01.10.2024 Registration deadline for participation
05.11.2024 Colloquium day 1, approx. 08:40-21:00
06.11.2024 Colloquium day 2, approx. 08:40-14:00

PARTICIPATION FEE

We charge a participation fee of 250 € as a contribution to the costs:

- Colloquium incl. welcome coffee & refreshments during breaks
- Lunch buffet and dinner on 05.11.2024
- Lunch on 06.11.2024
- Printed proceedings

The prices include taxes. We ask you to transfer the fees by **15.10.2024**, the bank details will be communicated after binding registration.

Cash payment on the day of the event is not possible.
A reduced fee is available for students on request.

CONFERENCE VENUE

Ruhr-Universität Bochum
Veranstaltungszentrum Saal 1
Universitätsstraße 150
44801 Bochum

KOORDINATION 2024
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COLLOQUIUM ON CAVITATION AND CAVITATION EROSION

OCCASION

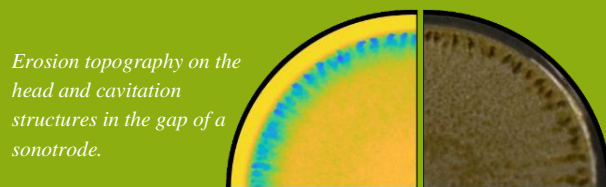
Cavitation has been the subject of research in various scientific disciplines for many decades, e.g., in physics, chemistry, mathematics, medicine and engineering.

The Ruhr University Bochum and the University of Duisburg-Essen are therefore jointly organizing a colloquium on cavitation and cavitation erosion for the fifth time.

The aim of the colloquium is to exchange knowledge and promote communication between representatives from academia and industry. The colloquium is designed as a networking workshop event, so contributions from different disciplines are welcome.

TOPICS AND DISCIPLINES

- Physics, medicine, chemistry, mathematics, engineering
- Fluid mechanics and materials science
- Fundamentals and application
- Theory, experiment and simulation
- Hydrodynamic and acoustic cavitation
- Turbo and displacement machinery, fluid and injection technology
- Cleaning technology
- Medical applications
- Bubble dynamics



Erosion topography on the head and cavitation structures in the gap of a sonotrode.

PROGRAM

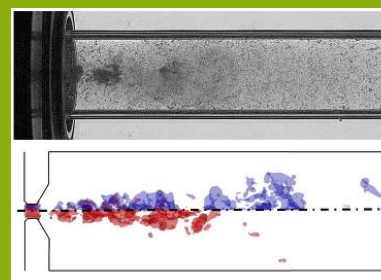
TUESDAY, 05. NOVEMBER 2024

08:15	Reception and welcome coffee
08:40	Greeting by Michael Pohl and Romuald Skoda
09:00	V. Agrež^{1,2}, Z. Heidary¹, M. Gravaise^{3,4}, R. Petkoviček², C.D. Ohl¹ : Bubble detachment from a vibrating electrode, ¹ : Inst. Phys., Department Soft Matter, OvGU Magdeburg, ² : Univ. Ljubljana, ³ : IVT, OvGU Magdeburg, ⁴ : SST, Univ. London
09:20	M. Dawoodian, O. el Moctar : Effects of gas pockets on nucleation and growing of nanobubbles, ISMT, UDE
09:40	V. Agrež^{1,2}, R. Petkoviček², C.D. Ohl¹ : Investigation of streamers formation during cavitation bubble collapse, ¹ : Inst. Phys., Department Soft Matter, OvGU Magdeburg, ² : Univ. Ljubljana
10:00	J. Mur^{1,2}, R. Petkoviček², C.D. Ohl^{1,3} : Sonoluminescence of erosive cavitation bubbles at solid boundaries, ¹ : Inst. Phys., Department Soft Matter, OvGU Magdeburg, ² : Univ. Ljubljana, ³ : STIMULATE, Univ. Magdeburg
10:20	Break
10:50	S. Razaee, E. Kadivar, O. el Moctar : Molecular dynamics simulations of a nanobubble's collapse-induced erosion on nickel boundary and porous nickel foam boundary, ISMT, UDE
11:10	S.I. Ghasebian^{1,2}, Y. Fan^{1,3}, F. Reuter¹, C.D. Ohl^{1,2} : Cavitation Induced Shear Wave Rheometry, ¹ : Inst. Phys., Department Soft Matter, OvGU Magdeburg, ² : STIMULATE, Univ. Magdeburg
11:30	U. Lantermann, O. el Moctar : Numerical Study of Single Cavitation Bubble Collapse near a Wall using a Mass Transfer Model, ISMT, UDE
11:50	C. Lechner¹, M. Koch¹, M. Tervo¹, R. Mettin² : Dynamics of acoustically excited bubbles close to a solid wall, ¹ : Inst. Fluid Mech. Heat Transfer, TU Wien, ² : 3. Phys. Inst., GAU Göttingen
12:10	Lunch
13:30	Y. Sun¹, Y. Fan², Z. Yao¹, C.D. Ohl^{1,2} : The collapse and jet formation of cavitation bubble under confined free surface, ¹ : CWRCE, China Agricultural University, ² : Inst. Phys., Department Soft Matter, OvGU Magdeburg
13:50	M. Koch¹, J.M. Rosselló², H.P. Hoeppe³, C. Lechner¹, R. Mettin¹ : Oblique jetting by bubbles close to the edge of a solid surface, ¹ : 3. Phys. Inst., GAU Göttingen, ² : Univ. Ljubljana, ³ : IRP, GAU Göttingen, ⁴ : Inst. Fluid Mech. Heat Transfer, TU Wien
14:10	H.J. Sagar^{1,2}, O. el Moctar² : Fluid-Structure Interaction between Single Cavitation Bubble & Elastic Metal Foil, ¹ : HRED, Indian Inst. Tech., ² : ISMT, UDE
14:30	Break
15:00	Y. Sharma, Y. Fan, C.D. Ohl : Nanobubble characterization using high-speed Ultrasound Imaging, Inst. Phys., Department Soft Matter, OvGU Magdeburg
15:20	M. Abedini¹, S. Hanke¹, F. Reuter² : In situ measurement of cavitation damage using a high-speed electrochemical technique, ¹ : Inst. Techn. der Metalle, UDE ² : Inst. Phys., Department Soft Matter, OvGU Magdeburg
15:40	Ž. Boček¹, M. Petkoviček², S.J. Clark¹, K. Fezzaa³, M. Dular¹ : Kelvin-Helmholtz instability governs emulsification by hydrodynamic cavitation, ¹ : Univ. Ljubljana, ² : APS, Argonne National Laboratory
16:00	Coffee break



Tip and hub vortex cavitation on a ship's propeller.

Air degassing at a cavitating nozzle flow: Air (blue) and vapor structures (red).



16:30	P. Pfeiffer, C.D. Ohl : On-demand cavitation inception in a Venturi channel, Inst. Phys., Department Soft Matter, OvGU Magdeburg
16:50	T. Krimm, G. Hatzissawidis, M.M.G. Kuhr, G.J. Ludwig, P.F. Pelz : Flow visualisation and surface pressure measurements on a modified CLE-hydrofoil, FST, TU-Darmstadt
17:10	M. Haese, R. Skoda : Compressible CFD method for the calculation of viscous effects in cloud cavitation, HSM, RUB
18:30	Dinner at Restaurant <i>Franz Ferdinand</i> , Bochum

WEDNESDAY, 06. NOVEMBER 2024

08:15	Welcome coffee
08:40	R. Mettin¹, A. Aghelmaleki¹, M. Tervo¹, M. Koch¹, C. Lechner², G. Brenner² : Influence of viscosity on cavitation structures and erosion, ¹ : 3. Phys. Inst., GAU Göttingen, ² : Inst. Fluid Mech. Heat Transfer, TU Wien, ³ : Inst. App. Mech., TU Clausthal
09:00	A. Peters, O. el Moctar : Numerical Investigation of the Effects of Phase Change on Sloshing-Induced Impact Pressures, ISMT, UDE
09:20	J. Groschopp, F. Rüdiger : Studie zur Charakterisierung kavitierender Prallstrahlen, ISM, TU-Dresden
09:40	P.T.L. dos Santos¹, J. Kurzynski², M. Abedini¹, M. Laubrock², S. Hanke¹ : Influence of reversed austenite on the cavitation-erosion and corrosion resistance of a super martensitic stainless steel, ¹ : Inst. Techn. der Metalle, UDE ² : Mat. Eng. Lab., FH Münster
10:00	Break
10:30	J. Stella¹, M. Pohl¹, A. Treff¹, B. Reetz² : Kavitationserosion von einem bleifreien Messing (CuZn10Si5Al1): Eine EBSD-Untersuchung zu einer Kupfer-basis Legierung mit hexagonaler Kristallstruktur, ¹ : Dpto. Ciencia de los Materiales, USB, ² : WP, RUB, ³ : Otto Fuchs Dülken GmbH & Co. KG
10:50	U. Bauerschäfer, L. Ledig, S. Gai : Untersuchung der Kavitationserosion an Komposit-Materialien und Beschichtungen mit ASTM G32-16, GMBU e.V. Halle
11:10	V. Cara, M. Abedini, S. Hanke : Effect of grain size on the cavitation erosion rate and mechanisms of 316L stainless steel after different heat treatments, Inst. Techn. der Metalle, UDE
11:30	Break
12:00	F. Krafft¹, J. Stella¹, M. Pohl¹ : Kavitationserosion von Cronidur 30: Eine Untersuchung der spannungsinduzierten martensitischen Umwandlung bei Kavitationsbeanspruchung, ¹ : WP, RUB, ² : Dpto. Ciencia de los Materiales, USB
12:20	J. Kühlmann¹, M. Abedini¹, V. Ersoy¹, S. Hanke², S.A. Kaiser¹ : Visualization of bubble cloud dynamics in acoustic cavitation with a counter-sample, ¹ : EMPI - Reactive Fluids, UDE, ² : Inst. Techn. der Metalle, UDE
12:40	T. Gianfelice, R. Skoda : 3D flow simulation to investigate the influence of temperature on the flow aggressiveness in the gap of an ultrasonic cavitation device, HSM, RUB
13:00	Farewell by Bettar Ould el Moctar
13:15	Lunch



Single bubble collapse near the wall: Experiment (left) and simulation (right).