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德国杜伊斯堡大学 Bettar el Moctar 教授学术报告

报告题目：Experimental and Numerical Investigations of Multiphase Flows
时　间：2019 年 4 月 9 日（星期二），下午 13:30
地　点：上海交大闵行校区木兰船建大楼 A1008 会议室
报告人：Prof. Dr.-Ing. Bettar el Moctar, University Duisburg-Essen, Germany

报告内容简介：

The content of the lecture consists of 3 different multiphase phenomena: Cavitation-Erosion, Sloshing and Free surface flow related Fluid-Structure Interaction. The governing equations describing the cavitating flow will presented and discussed. The collapse of the cavitation cavity/bubble results into the solid surface damaging mechanism. There are two main hypotheses made to explain the damage mechanism: radiated pressure wave and microjet. Both hypotheses will be described. In the first part, 3-D numerical analysis of the single laser induced cavitation bubble will be presented. The flow is captured by solving conservation and state equations. To account for the multiphase flow (water-vapour), a Hybrid Euler-Lagrange Cavitation Model (HELCM) is presented. It combines the Euler approach based on Volume of Fluid (VoF) method where the source term of the transport equation of the VoF function is based on the simplified Rayleigh-Plesset equation and a Lagrangian Method. Details of the collapsing mechanism in the experiments and the computations will be discussed. Erosion models based on two hypotheses are developed, microjet phenomena and collapsing aggressiveness. Both models are applied to predict cavitation erosion through axisymmetric nozzle. Results obtained from computations are compared with the experiments. Physical phenomena associated with sloshing and challenges related to numerical and experimental investigations are described and discussed. Following to this, an experimental procedure to investigate phase change on sloshing will be presented. Finally, an international Benchmark study of sloshing induced loads will be discussed. State-of-the-art modelling of irregular waves and challenges related to wave modelling in shallow water will be discussed. A modified phase-amplitude iteration scheme used to obtain focused wave trains is described. The overall capability of numerical methods for free-surface flow related Fluid-Structure interaction will be presented. 2-way coupling approach to obtain wave loads as well as dynamic amplification of loads acting on Offshore-Wind turbines will be presented.

报告人介绍：

Bettar el Moctar, studied Naval Architecture and Ocean Engineering at the University of Hamburg/Germany. He graduated in 1997 and has since then worked as a research assistant in different departments of the University of Technology Hamburg, where he has specialized in computational fluid dynamics. He completed his doctorate at the University of Technology Hamburg with a dissertation entitled "Numerical Computation of Forces Acting on Maneuvering Ships." In 2000 he joined the Hamburg Ship Model Basin (HSVA) and worked as a research engineer. He was head of department of fluid dynamics at Germanischer Lloyd from 2002 to 2008 and global head of research at DNV GL from 2013 to 2016. Since 2008 he has been working at the University Duisburg-Essen as a full professor for ship technology and Ocean Engineering. He is editor and co-editor for several international journals. His publications cover various aspects of hydrodynamics and Fluid-Structure-Interaction. The focus of his research is the development of numerical and experimental methods for seakeeping, hydroelasticity, cavitation, slamming and sloshing, manoeuvring and propulsion in waves (https://www.uni-due.de/IST/elmoctar.php).

欢迎大家参加！

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