学 术 报 告

时间: 2010 年 10 月 26 日上午 10:30

地点: 过程大厦 2 楼 223 室

TITLE: CFD modelling of multiphase flow in gas-liquid and gas-solid systems

SPEAKER: DR YUQING FENG

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ABSTRACT

The subject of multiphase flows encompasses a vast field, a broad range of engineering disciplines, chemical engineering in particular. Computational Fluid Dynamics (CFD) modelling has been developed at different time and length scales and is playing an increasingly important role in process design, control and optimisation nowadays.

On this seminar, the speaker will first present a general review of CFD modelling on multiphase flow, followed by some case studies in gas liquid and gas solid flow systems from his previous and on-going research projects.

For gas solid systems, the speaker will present his Ph D work in discrete particle simulation of gas solid flow in a gas fluidized bed of particle mixtures and in blast furnace raceway, which include the assessment of the effect of modelling formulations on the fluidization behaviour of gas solid flow, a micro-dynamic analysis of the mixing/segregation behaviour of particle mixtures in gas fluidisation at different gas injection velocities, initial packing and bed thickness, and the effect of bed height and combustion on gas-solid flow in blast furnace raceway.

For gas liquid flow system, the speaker will present his current work at CSIRO: CFD modelling of gas liquid bubbling flow applied in Aluminium Reduction Cell, which includes a model validation using PIV measurement and an extension to whole cell study of bath hydrodynamics using two fluid model.

Finally, the so-called multi-scale modelling methodology will be introduced with possible application to some scientific and engineering disciplines.

ABOUT THE PRESENTER

Dr Yuqing Feng works at CSIRO Mathematics, Informatics and Statistics as a senior research scientist, mainly in the development and application of CFD modelling for multiphase complex flow systems.

As a key team member, Dr Feng has joined a few national priority light metal flagship projects, aiming to create a world-scale, integrated light metals industry with reduced costs and pollution and improved performance. His major research topics includes bubble driven bath flow in aluminium reduction cells, gas solid blow in fluidized beds for light metal production, droplet collision in Copper Flash Smelting Furnace, DEM-CFD modelling of particulate fluid flow in mineral processing equipment. He also takes consulting projects for different industries.

Through International Science Linkage (ISL) program of Australia Academy of Science (AAS), Dr Feng is visiting IPE aiming to study EMMS model for gas solid systems and possible extension for gas liquid system. Through this visit, Dr Feng wish to bring together complementary strengths of CAS and CSIRO to tackle the challenging problems of CFD modelling of multiphase flow critical to applications of strategic importance both to China and to Australia, while growing the relationship between CAS and CSIRO.