

Nuclear Engineering Department

Brief Introduction



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Department of Nuclear Engineering_History

- Founded in 1958
- Engineering Physics Department
- The core discipline for graduate education is “Nuclear Science and Technology” discipline authorized to confer Ph. D. degrees. including 2 sub-disciplines
 - Nuclear Energy science and Engineering
 - Nuclear Technology and Application



New School

- April 9, 2006
- School of Nuclear Science and Technology



Faculty and Staff

- Total 17
 - Professor: 7
 - Associate Professor: 4
 - Lecturer: 3
 - Lab Engineer: 3
- With Ph. D Degree: 10



Education

- Undergraduate Students
 - Total: 240
- Graduate Student
 - Master : 60
 - Ph. D: 20



Education

- Published Textbook
 - Nuclear Reactor Physics Analysis
 - Nuclear Reactor Safety Analysis
 - PWR Operation
 - Nuclear Reactor Control
 - Nuclear Reactor Thermal hydraulics
 - Boiling Heat Transfer and Two Phase Flow
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RESEARCH AREAS

- Nuclear reactor physics
- Nuclear reactor Thermalhydraulics
- Nuclear reactor Control
- Nuclear reactor accident analysis and safety assessment
- Nuclear technology and application



Nuclear Reactor Physics

- Fuel cycle analysis
- New method for reactor physics analysis



Nuclear Reactor Thermalhydraulics

- CHF experiments and prediction
- Heat transfer deterioration analysis under supercritical condition
- Natural circulation capability of CARR
- Thermal hydraulics characteristics of narrow gap channel
 - Rectangle and annular channel
 - Single phase and two phase flow
 - Heat transfer and flow characteristics
- Instability code for nuclear reactor system
- Analysis of passive residual heat removal system



Nuclear Reactor Control

- Simulation of CARR automatic startup and power regulation
- New Control Method
 - Fuzzy Control
 - Tolerate-Fault Control
 - Fully Liquid Metal Control



Nuclear safety

- Inherent safety analysis of LMFBR
- PSA analysis of nuclear reactor
- Space nuclear reactor development
- Severe accident analysis



Nuclear technology and application

- Radiation effect on material
- Space nuclear electric source
- Radiation imaging
- Well logging



Funds from...

- NSFC
- NPIC
- CIAE
- SNERI
- BENI
- Nuclear power plants



About GIV

- Sodium cooled Fast reactor: Since 1984
 - Physics, thermalhydraulics, safety, I&C
 - Projects funded by CIAE, NSFC
- Molten Salt Reactor
 - Projects funded by NSFC
- Supercritical Water Reactor
 - Supercritical experiments



EXPERIMENTAL FACILITIES

- Water thermo-Hydraulic Lab
- Liquid Sodium Thermo-Hydraulic Lab
- Nuclear Radiation and measurement Lab
- Nuclear Reactor Instrumentation and Control Lab
- Nuclear Power Plant Simulation System
- Parallel Computer System



TRAINING

- The department has been training personnel per-working for NPP since 1986.
- “*Nuclear Power Training Center*” was established in 1995.
- We have trained about 600 personnel for Daya Bay, Qinshan phase 3 and Tianwan Nuclear Power Plant separately,
- Compiled all of the textbook for training.



Cooperation with AECL

- Long history
 - Since 1998
- Education
 - Technical material exchange
 - Lectures, Presentations
 - Compile 14 Chinese and English version books for CANDU
 - CANU system and operation, multimedia CD
Published by XJTU press
 - Add CANDU information in course
 - Scholarship provided by AECL



Cooperation with AECL

- Research

- Fuel cycle: use of PWR waste fuel in CANDU
- Modeling of CANDU 6 system
- Select a young professor to AECL as visiting professor
- Transfer of AECL code: CATHENA, WIMS



Further Cooperation

- Renew the code transfer certification
- Restart the scholarship
- Transferring ASSERT code
 - Jian SHAN ever used it in CRL
 - Development for supercritical condition use



Further Cooperation

- Research

- Thermalhydraulics Experimental in Multiphase Flow State key Lab and NED water test loop
- CHF experiments and prediction at near critical point
- Heat transfer deteriorate analysis under supercritical condition



Further Cooperation

- Code Development
 - Subchannel code for supercritical condition
 - Instability analysis for supercritical water reactor
 - Physical analysis code for supercritical condition
- System simulation