



# Introduction of Research Scopes and Topics

ASEAN NPSR 4<sup>th</sup> Annual Meeting

By Tang Jia Hao

# Conclusion of last benchmark problem

ASEAN NPSR  
4<sup>th</sup> Annual Meeting

- Progress in Nuclear Energy: Inter-comparison of transboundary atmospheric dispersion calculations: A summary of outputs from the ASEAN NPSR benchmark exercise

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Inter-comparison of transboundary atmospheric dispersion calculations: A summary of outputs from the ASEAN NPSR benchmark exercise

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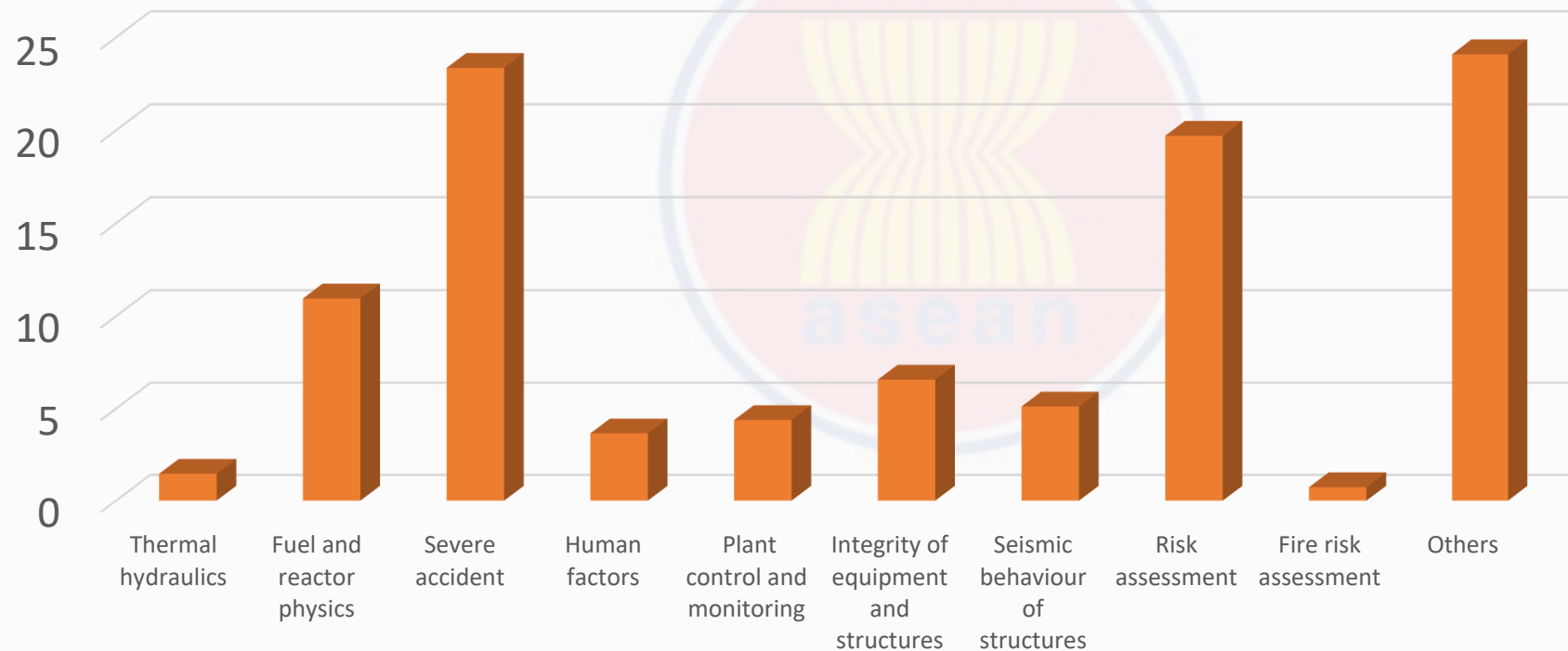
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Emergency response

**ABSTRACT**

Previous nuclear power plant (NPP) severe accidents have raised great concern in Southeast Asia on the issue of transboundary atmospheric dispersion of an accidental release from an external NPP. This study presents the inter-comparison of atmospheric dispersion calculations performed by different calculation codes employing Lagrangian particle model or Gaussian puff model with Southeast Asia weather data during the northeast monsoon period. The test case is a hypothetical accident in Fangchenggang NPP with a hypothetical source term. Radionuclide concentration and radiation dose distribution maps along with specified values at specific locations are compared to demonstrate the similarities and differences of each calculation code. All calculation codes can generally capture the dispersion pathway, though only those employing Lagrangian particle model can record microscale changes in wind direction. Analysis of predicted exposure extent and lead time shows that radioactive plume contributing to the radiation dose of several  $\mu\text{Sv}/\text{day}$  can reach one or more ASEAN countries within the 24-h timeframe. This information can be used to design appropriate risk communication strategy to dispel unnecessary public anxiety or to plan for more extensive radiation monitoring capability. For this purpose, Gaussian puff model can be used to provide initial information which can be later confirmed by Lagrangian particle model.

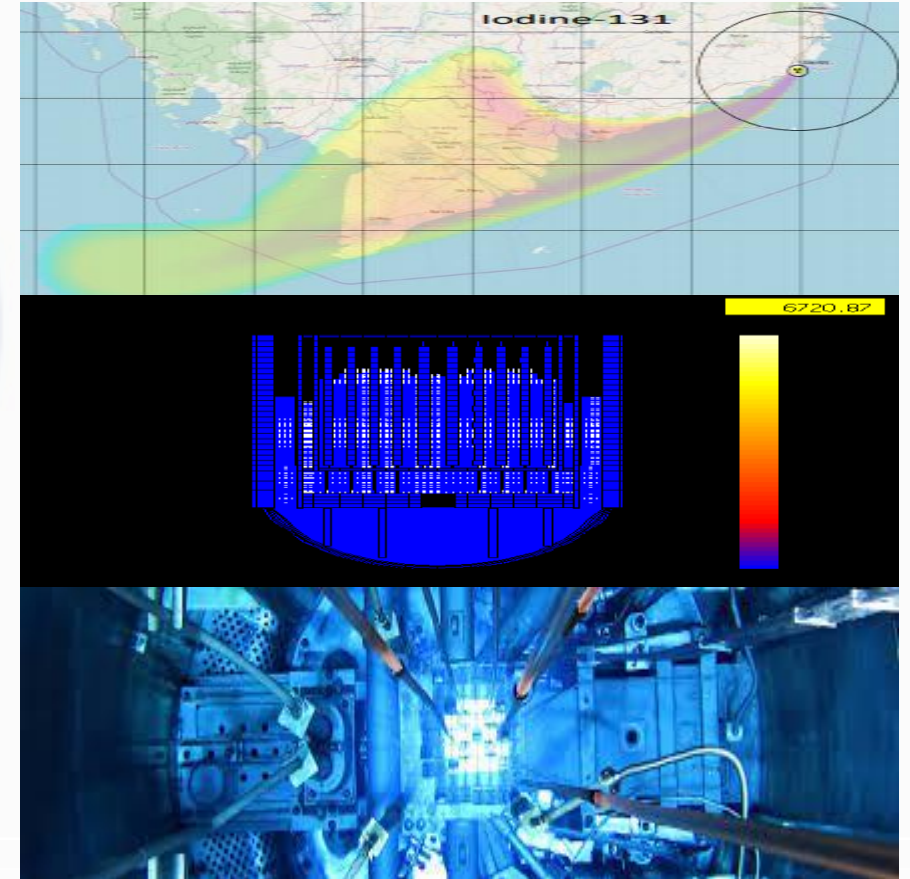
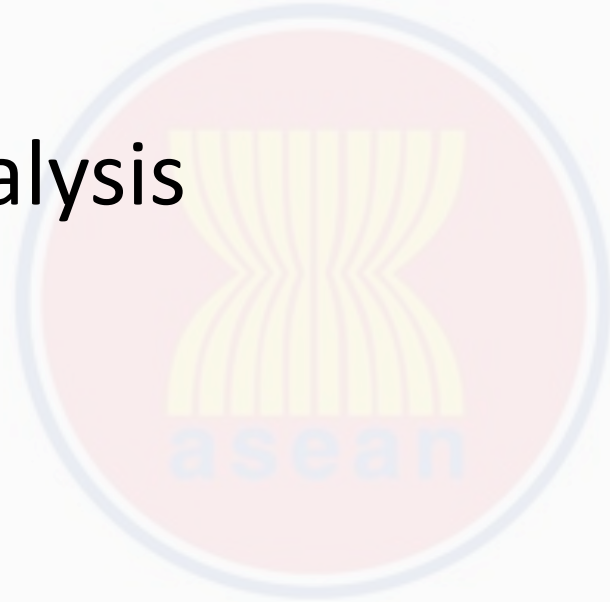
# Research scope interest

**Percent** ranking score of research scope interest in nuclear power safety fields that ASEAN NPSR participants in the latest workshop think that it should be improved as collaborative works in ASEAN in the future. (% ranking score)



- Impacts of nuclear renewable hybrid energy system
- Deterministic and probabilistic models for NPP accident risks assessment
- Uncertainties of dispersion simulation
- Dose assessment in emergency scenario or baseline study unique to the region.
- Natural disasters in Asia that may cause severe accidents in Asian nuclear power plant

- Atmospheric Dispersion & Dose Assessment
- Severe Accident Analysis
- Research Reactor

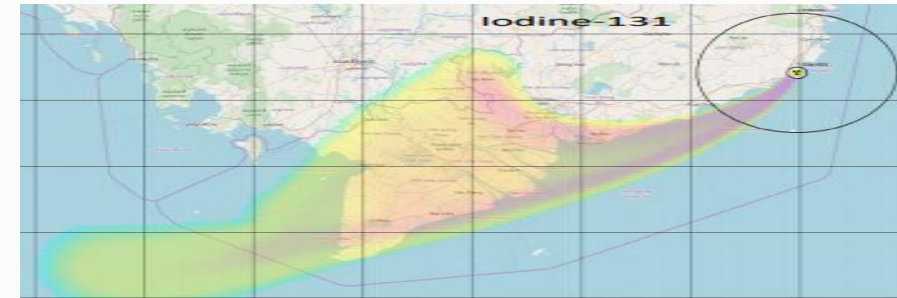


# Atmospheric Dispersion & Dose Assessment

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Focus on atmospheric dispersion from existing NPP and dose assessment from such accidental release. Assessment of radiation dose methodology unique to our region could be a possibility

- Long range dispersion of radionuclides
  - Specific Scenario of interest
  - Factors of interest
- Dose assessment evaluation specific to ASEAN region
  - Benchmark of Dose assessment methods

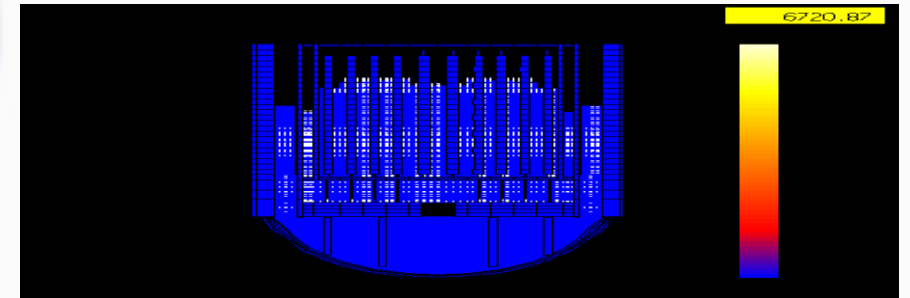


# Reactors Safety (severe accident analysis)

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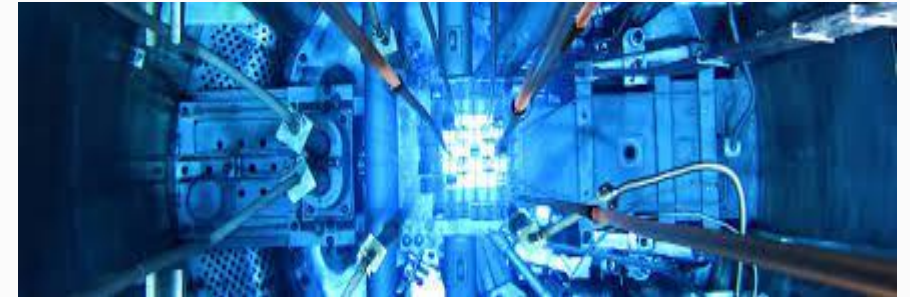
Focus on **Severe accident analysis of Nuclear power plant such as light water reactor, HTGR or even fusion**. Includes many different possible aspects of a nuclear power reactor. Not necessarily focused on simulation of severe accidents

- Fission Products from PWR
- Neutronics
- Thermal Hydraulics
- Safety Analysis
- Probability risk assessment
- Any aspects of Reactor



Focus on different aspects of a research reactor to help facilitate current possessor of research reactor to better operate their reactors

- Probability risk assessment level 1
- Safety Analysis
- Reactor design and analysis

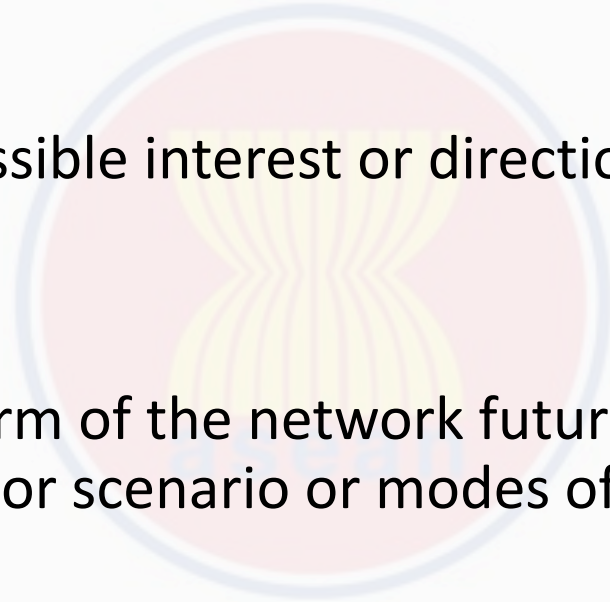


Feel Free to suggest other possible research interest that could be applicable for the network:

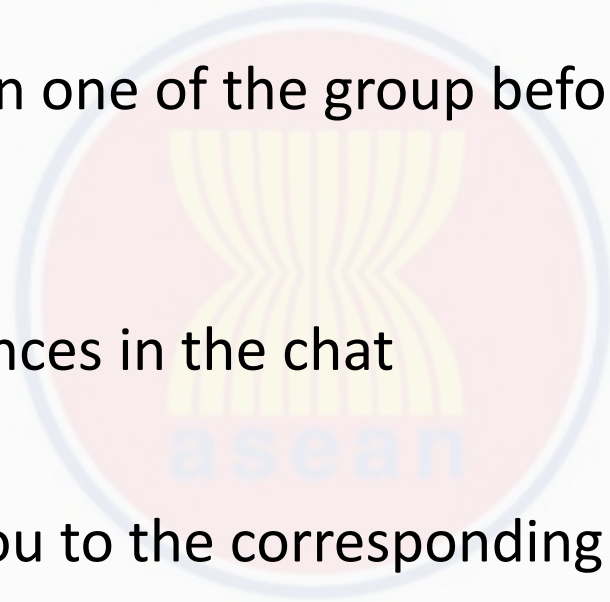
E.g. -Nuclear hybrid energy

- Uncertainties of dispersion simulation
  - Dose assessment in emergency scenario or baseline study unique to the region
- 
- The Member States can propose bilateral, trilateral or multilateral research collaborations in the Annual Meeting for ASEAN Network on Nuclear Power Safety Research, and the joint parties can share the results of research collaborations
  - The network can try to facilitate such research collaborations to the best of their ability in the future

- As the three topics are rather different, we are thinking of breaking the groups into smaller groups for discussion.
- Each group will discuss on possible interest or direction of research under the proposed theme
- Discussion can cover brainstorm of the network future research interest, establishing some key factors or scenario or modes of future collaboration
- After the discussion, we will gather for a session where the contents are summarized, shared and agreed upon by the network

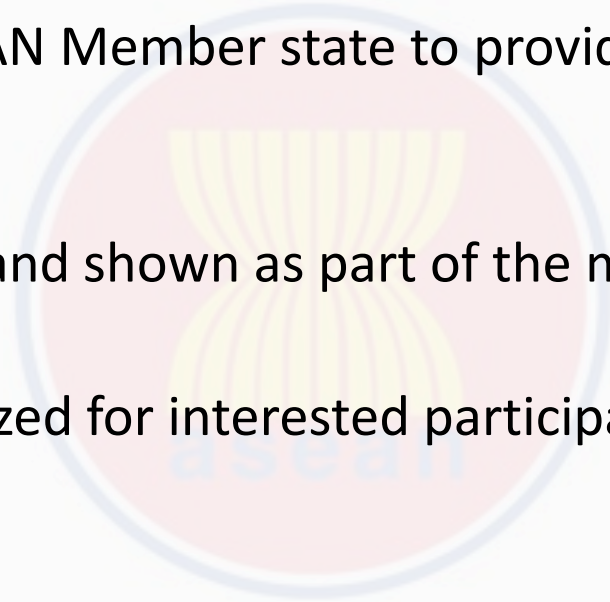


- The discussion will be done with the breakout room feature
- Please indicate your interest in one of the group before the start of the next session(during the break).
- You can indicate your preferences in the chat
- Our facilitators will allocate you to the corresponding room in the discussion



In case, there is no decision or clear direction of research topic after the annual meeting

- We would like that each ASEAN Member state to provide an official list of nuclear research interest
- The interest will be grouped and shown as part of the meeting summary
- Group meeting will be organized for interested participants to further explore such interest



# Conclusion

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- Research topics
  - Atmospheric Dispersion and Dose Assessment
  - Severe Accident Analysis
  - Research Reactor
- Suggestions?
- Please indicate your preferences in the chat box



Thank you for your attention