JRC SJTU-NTNU

2015 - 2016

Offshore Wind & Smart Grids

- **Start up activity within the new group (End of 2012)**
  - **—« Offshore Wind & Smart Grids »**

- **Effective start in January 2015 with the stay of Jing Lyu at NTNU**
  - **- after my return from Sabbatical**

Offshore Wind & Smart Grid Team

Prof. Zheng Li

Prof. Xu Cai

Prof. Marta Molinas

Group 1

Group 2

Joint Publications (2015-2016)

Journals: 4, Conferences: 3

A. Rygg, M. Molinas, C. Zhang and X. Cai, “A modified sequence domain impedance definition and its equivalence to the dq-domain impedance definition for the stability analysis of AC power electronic systems”. Submitted to IEEE Journal of selected and emerging topics of power electronics

A. Rygg, M. Molinas, C. Zhang and X. Cai, “Frequency-dependent source and load impedances in power systems based on power electronic converters”. Submitted to the 19th Power Systems Computation Conference, June 2016, Genoa Italy

Mohammad Amin, Jing Lyu, M. Molinas "Oscillatory Phenomena Between Wind Farms and HVDC Systems: The impact of Control" 16th IEEE COMPEL, 12-15 July 2015, Vancouver, BC Canada

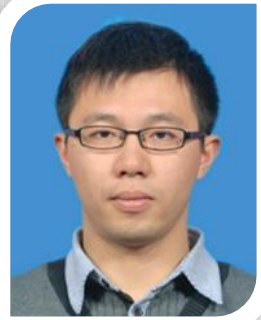
Mohammad Amin, Jing Lyu, Xu Cai. Marta Molinas**,** Impact of Power Flow Direction on the Stability of VSC-HVDC seen from the Impedances Nyquist Plot . **(**IEEE Trans. on Power Electronics, First review)

Jing Lyu, Xu Cai, Marta Molinas, "Impedance modeling of modular multilevel converters," IEEE IECON 2015, 2015.11, Yokohama, Japan.

Jing Lyu, Xu Cai, Marta Molinas, "Frequency Domain Stability Analysis of MMC-Based HVDC for Wind Farm Integration," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 4, no. 1, pp. 141-151, March 2016.

Jing Lyu, Xu Cai, Mohammad Amin, Marta Molinas, "Stability analysis of MMC-based HVDC for offshore wind farms: impacts of control parameters," in IEEE Trans. Power Delivery, 2015 (Ready to be submitted).

Atle Rygg-Chen Zhang



- **Joint Papers:**

A. Rygg, M. Molinas, C. Zhang and X. Cai, "A modified sequence domain impedance definition and its equivalence to the dq-domain impedance definition for the stability analysis of AC power electronic systems". Submitted to IEEE Journal of selected and emerging topics of power electronics

A. Rygg, M. Molinas, C. Zhang and X. Cai, "Frequency-dependent source and load impedances in power systems based on power electronic converters". Submitted to the 19th Power Systems Computation Conference, June 2016, Genoa Italy

- **Research stay:**

Zhang Chen visited NTNU for a period of 3 months in 2015

Result: One joint conference paper, one joint IEEE Transaction paper.

Mohammad Amin

- **Joint Papers:**

Mohammad Amin, Jing Lyu, M. Molinas "Oscillatory Phenomena Between Wind Farms and HVDC Systems: The impact of Control" 16th IEEE COMPEL, 12-15 July 2015, Vancouver, BC Canada

Mohammad Amin, Jing Lyu, Xu Cai. Marta Molinas**,** Impact of Power Flow Direction on the Stability of VSC-HVDC seen from the Impedances Nyquist Plot . **(**IEEE Trans. on Power Electronics, First review)

- **Research stay at SJTU:** Mohammad Amin visited SJTU for a period of 2 months in 2015
- Experiment has been completed at the lab in SJTU

Jing Lyu

- **Joint Papers:**

Jing Lyu, Xu Cai, Marta Molinas, "Impedance modeling of modular multilevel converters," IECON 2015, 2015.11, Yokohama, Japan.

Jing Lyu, Xu Cai, Marta Molinas, "Frequency Domain Stability Analysis of MMC-Based HVDC for Wind Farm Integration," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 4, no. 1, pp. 141-151, March 2016.

- **Research stay at NTNU:** Jing Lyu visited NTNU for a period of 3 months in 2015

- **Plan for publication:**

Jing Lyu, Xu Cai, Mohammad Amin, Marta Molinas, "Stability analysis of MMC-based HVDC for offshore wind farms: impacts of control parameters," preparing to submit to IEEE Trans. Power Delivery. (To be submitted)

Jing Lyu, Xu Cai, Mohammad Amin, Marta Molinas, "Impact of PLL and Short-circuit ratio on stability of wind farm integration through MMC-HVDC," preparing cooperative paper. (under preparation)

CIGRE-China
HVDC Conference October 2015

IEEE COMPEL 2016 Trondheim-NTNU

IEEE COMPEL 2016

The Norwegian University of Science and Technology – NTNU
Trondheim, Norway, 27 – 30 June, 2016
http://ieee-compel.org/

- **Jing Lyu**, Qiang Chen and Xu Cai. Impedance Modeling of Modular Multilevel Converters by Harmonic Linearization

- Qiang Chen, **Jing Lyu**, Rui Li and **Xu Cai**. Impedance modeling of Modular multilevel converter based on harmonic state space

PLANS FOR THE FUTURE (2016-2018)

Plans for furthering the collaboration

- ERCIM Post Doc Application at NTNU:
  Jing Lyu: 2017-2019

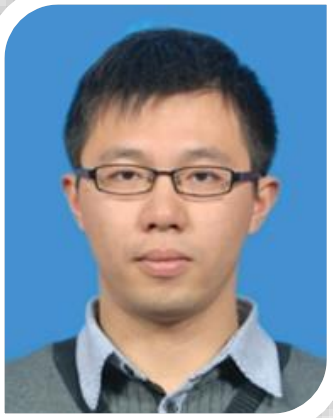
- Continuing the joint research of Group 1 and Group 2

Group 1

- **Members:** Atle Rygg, Chen Zhang, Mohammad Amin

- **Suggestion for joint research article:** Experimental validation at the NTNU laboratories of the stability analysis jointly developed during the stay of Chen Zhang at NTNU

- **Expected outcome:** 2 journal paper to IEEE Transactions
  - Chen Zhang
  - Atle Rygg

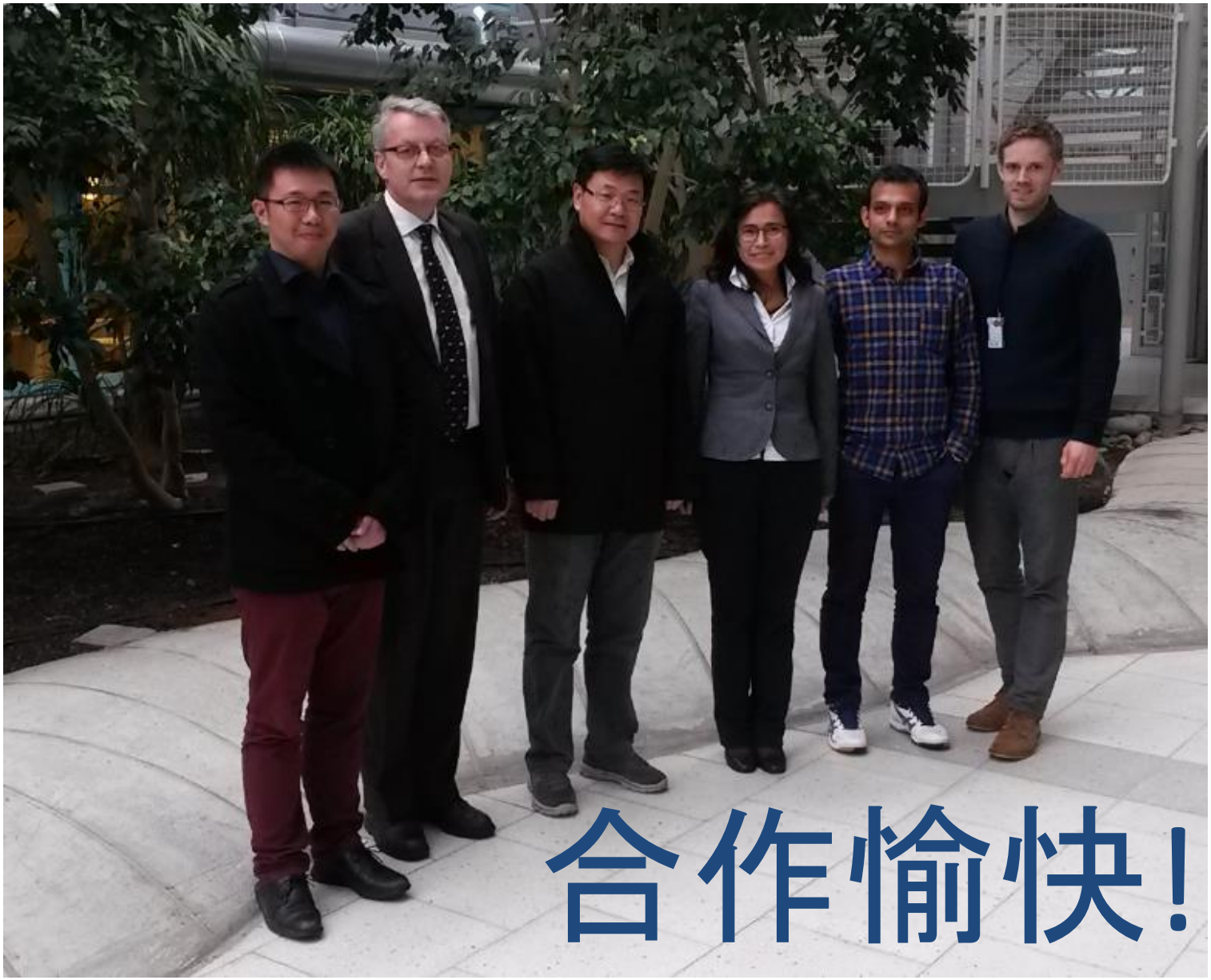


Group 2

- **Members:** Jing Lyu, Mohammad Amin

- **Suggestion for joint research:**
  Multi terminal MMC based HVDC systems: identify the source of electrical oscillations in these systems.

- **Expected outcome:**
  2 journal paper to IEEE Transactions, IET
  - Jing Lyu
  - Mohammad Amin


合作愉快!

Zhang Chen

- **Joint Papers:**

A. Rygg, M. Molinas, **C. Zhang** and X. Cai, "A modified sequence domain impedance definition and its equivalence to the dq-domain impedance definition for the stability analysis of AC power electronic systems". Submitted to IEEE Journal of selected and emerging topics of power electronics

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