



# Analysis and PDE Seminar

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TITLE: Periodic Maxwell-Chern-Simons vortices with concentrating property

*Date* : July 21st, 2021 (Wednesday)  
*Time* : 10 am-11 am (Hong Kong time)  
11 am-12 noon (Korea time)  
*Link to ZOOM* : <https://unist-kr.zoom.us/j/3170659442>  
Meeting ID : 317 065 9442  
Password : APDE21

**Abstract.** In order to study electrically and magnetically charged vortices in fractional quantum Hall effect and anyonic superconductivity, the Maxwell-Chern-Simons (MCS) model was introduced by [Lee, Lee, Min (1990)] as a unified system of the classical Abelian-Higgs model (AH) and the Chern-Simons (CS) model. In this talk, the first goal is to obtain the uniform (CS) limit result of (MCS) model with respect to the Chern-Simons parameter, without any restriction on either a particular class of solutions or the number of vortex points, as the Chern-Simons mass scale tends to infinity. The most important step for this purpose is to derive the relation between the Higgs field and the neutral scalar field. Our (CS) limit result also provides the critical clue to answer the open problems raised by [Ricciardi, Tarantello (2000)] and [Tarantello (2004)], and we succeed to establish the existence of periodic Maxwell-Chern-Simons vortices satisfying the concentrating property of the density of superconductive electron pairs. Furthermore, we expect that this (CS) limit analysis would help to study the stability, multiplicity, and bubbling phenomena for solutions of the (MCS) model.

*All are welcome*

This is a joint activity organized by Department of Mathematics, The Chinese University of Hong Kong, Hong Kong; Department of Mathematics, Institute of Mathematical Research, Research Division of Mathematical and Statistical Science, The University of Hong Kong, Hong Kong; and Department of Mathematical Sciences, Ulsan National Institute of Science and Technology, Korea.