

# Global regularity issue of the Hall-magnetohydrodynamics system

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## Abstract

Whether or not the solution to the  $2\frac{1}{2}$ -dimensional Hall-magnetohydrodynamics system starting from smooth initial data preserves its regularity for all time remains a challenging open problem due to its intricate term called Hall-term. This talk discusses the proof of the challenging problem, however, where the sum of the derivatives in diffusion that our global regularity result requires  $11 + \epsilon$  for any  $\epsilon > 0$  while the analogous sum for the classical  $2\frac{1}{2}$ -dimensional Hall-magnetohydrodynamics system is 12 considering  $-\Delta u$  and  $-\Delta b$ . In addition, the talk presents some global regularity criteria for both the  $2\frac{1}{2}$ -dimensional and 3-dimensional Hall-magnetohydrodynamics systems. This is the joint work with Prof. Kazuo Yamazaki.