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MMS 衛星による高域混成波高調波及びラングミュア波高調波の統計解析

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Statistical analysis of harmonic upper hybrid and Langmuir waves observed by the MMS spacecraft

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Waves near the electron plasma frequency, such as upper hybrid waves and Langmuir waves, are often observed in the Earth's magnetosphere. Recently, harmonics of upper hybrid waves were observed in the electron diffusion region of magnetotail reconnection [Dokgo+2019; Li+2021], and they were believed to be generated by energetic electrons. However, since these harmonic waves were observed only in a few cases, their detailed characteristics, including their excitation conditions, generation regions, and their roles, are still unknown. In this study, we analyze harmonics of upper hybrid and Langmuir waves in the Earth's magnetosphere observed by the MMS spacecraft and report our preliminary results.