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Development of Local Oscillator Integrated Antenna Array for Electron Cyclotron Emission Imaging Diagnostics.[1] DAISUKE KUWAHARA, Tokyo Univ of Agri Tech, NAOKI ITO, National Institute of Technology, Ube College, YOSHIO NAGAYAMA, HAYATO TSUCHIYA, National Institute for Fusion Science, MASAYUKI YOSHIKAWA, JUNKO KOHAGURA, University of Tsukuba, TOMOKAZU YOSHINAGA, National Defense Academy, SOICHIRO YAMAGUCHI, Kansai University, YUICHIRO KOGI, Fukuoka Institute of Technology, ATSUSHI MASE, Kyushu University — Microwave imaging systems include difficulties in terms of multi-channelization and cost. Our group solved these problems by developing a Horn-antenna Mixer Array (HMA), a 50 - 110 GHz 1-D heterodyne-type antenna array, which can be easily stacked as a 2-D receiving array. However, the HMA still evidenced problems owing to the requirement for local oscillation (LO) optics and an expensive high-power LO source. To solve this problem, we have developed an upgraded HMA, named the Local Integrated Antenna array (LIA), in which each channel has an internal LO supply using a frequency multiplier integrated circuit. Therefore, the proposed antenna array eliminates the need for both the LO optics and the high-power LO source. However, the LIA still has problems, that the instabilities of the sensitivity and poor channel isolation. This paper describes the principle of the LIA, and solutions of above-mentioned problems.

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