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Peer-to-Peer Locking of Magnetrons[1] EDWARD CRUZ, IAN RITTERSDORF, Y.Y. LAU, RON GILGENBACH, University of Michigan, UNIVERSITY OF MICHIGAN TEAM — Coherent power combining of multiple high-efficiency, moderate power magnetrons might be achieved via peer-to-peer locking, in which each magnetron acts as a master of and a slave to all others [1]. In peer-to-peer locking of two magnetrons, dependent on the degree of coupling, the frequency of oscillation when locking occurs does not necessarily lie between the two magnetrons' free running frequencies. Likewise, when the locking condition was violated, the beat frequency is not necessarily the difference between the free running frequencies. These features were observed in our experiments on the peer-to-peer locking of two 1-kW magnetrons [2]. The stability (accessibility) and temporal evolution of the two possible states, together with phase measurements, will be reported. Our theory shows that peer-to-peer locking in the presence of a frequency chirp may be approximately achieved, if the locking condition [1] is satisfied locally.

[1] P. Pengvanich et al., Phys. Plasmas 15, 103104 (2008).
[2] E. Cruz et al., Appl. Phys. Lett. 95, 191503 (2009).

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