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Numerical Simulation of Plasma Maser Process

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The plasma maser, a novel and unique mechanism capable of up-converting the plasma waves, has been a subject of intensive theoretical research since it was first formulated by Nambu and Tsytovich. Recently, Sakai and his colleagues performed a series of numerical simulations to show that high frequency Langmuir waves are generated when low frequency Alfven waves are

present, suggesting that the plasma maser process is in progress. In this presentation we improve their simulations by (1) using a 1-d instead of 2-d simulation code so that there is less noise in the system, and by (2)

starting the run with a prescribed finite amplitude low frequency wave instead of exciting it via temperature anisotropy instability. We will discuss the roles, consequences, and a possible way to detect trace of the plasma maser process in a space plasma.