

ELECTROMAGNETIC RADIATION EMITTED BY THE STIMULATED PLASMA RESONANCE

IN THE ACTIVE EXPERIMENT IN SPACE

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Stimulated plasma wave experiments have been successfully performed in the ionosphere and magnetosphere by the JIKIKEN(EXOS-B) and INTERCOSMOS-19 satellites<sup>1,2</sup>. A variety of plasma resonances were observed. In particular, plasma resonance near the local plasma frequency ( $f_p$ ) was detected. The observed plasma resonance was found to be in a strongly turbulent state in the vicinity of the INTERCOSMOS-19 satellites. The plasma turbulence excited was in the supersonic regime since the wave energy density is comparable with the plasma thermal energy. A theory is presented which shows that, in the presence of supersonic Langmuir turbulence, stimulated electromagnetic radiation can be generated through electromagnetic parametric instabilities driven by intense Langmuir waves<sup>3</sup>. It is shown that the growth rates of these parametric instabilities are identical to the growth rates of electrostatic Langmuir parametric instabilities. Hence, it is suggested that the stimulated electromagnetic emission can become a useful technique to study plasma resonance in future satellite experiments in space.

<sup>1</sup> H. Oya, T. Ono, and T. Kamada, J. Geomag. Geoelectr. 33,3 (1981)

<sup>2</sup> S. A. Pulinetz and V. V. Selegy, J. Atm. Terr. Phys. 48, 149 (1986)

<sup>3</sup> A. C. -L. Chian, Proceeding of Chapman Conference on Plasma Waves and Instabilities in Magnetospheres and at Comets, p.378 (Sendai, 1987)