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**Parasitic oscillation study on CRPP X3 gyrotron** FENGPING LI, JEAN-PHILIPPE HOGGE, Ecole Polytechnique Fédérale de Lausanne (EPFL), Centre de Recherches en Physique des Plasmas (CRPP), Association EURATOM-Confédération Suisse, ANDREAS SCHLAICH, Karlsruhe Institute of Technology (KIT), Association EURATOM-KIT, IHM, 76021 Karlsruhe, Germany, STEFANO ALBERTI, MIGUEL SILVA, Ecole Polytechnique Fédérale de Lausanne (EPFL), Centre de Recherches en Physique des Plasmas (CRPP), Association EURATOM-Confédération Suisse — Parasitic oscillations have a high impact to high power Gyrotron operation. They can degrade the beam quality, reduce the interaction efficiency and reduce the power production. Furthermore, it can cause the stability of the gyrotron operation which leads to unwanted oscillation modes and this unwanted oscillation modes can sometimes cause serious damage to gyrotron. In these paper the parasitic oscillation have been studied based the the 2s, 118 GHz X-3 gyrotron at CRPP. One frequency counter (70-170 GHz) with  $\sim 20$  ms sample ratio was used to monitor the entire pulse of the main modes. Two mixer systems were used to monitor the spectrum of the output RF. One mixer system is based on harmonic mixer with fast oscilloscope which can record  $\sim 6$ GHz bandwidth spectrum with maximum time duration of 4 ms. Another is based on mixer and a 16 channel band-pass multiplex (in 4 GHz bandwidth) which can record pulse and CW signals. Parasitic oscillations were recorded and compared during different part of the pulse. The gyrotron operation parameters have been swept to check the change and evolution of these parasitic oscillations.

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