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Title:Development and applications of high-frequency gyrotrons in FIR FU covering the sub-THz to THz range

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Abstract:Powerful sources of coherent radiation in the sub-terahertz and in the terahertz frequency range of the electromagnetic spectrum are necessary for a great and continuously expanding number of applications in the physical research and in various advanced technological processes as well as in radars, communication systems, for remote sensing and inspection etc.. In recent years, a spectacular progress in the development of various gyrodevices and in particular of the powerful high frequency (sub-terahertz and terahertz) gyrotron oscillators has demonstrated a remarkable potential for bridging the so-called terahertz power gap and stimulated many novel and prospective applications. In this review paper we outline two series of such devices, namely the Gyrotron FU Series which includes pulsed gyrotrons and Gyrotron FU CW Series which consist of tubes operated in a CW (continuous wave) or long pulse mode, both developed at the FIR FU Center. We present the most remarkable achievements of these devices and illustrate their applications by some characteristic examples. An outlook for the further extension of the Gyrotron FU CW Series is also provided. © Springer Science+Business Media, LLC 2011.

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