

Combined UTC-PD integrated THz source and a leaky wave antenna with complementary split ring resonators along a planar Goubau line

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Abstract— We have fabricated a terahertz source based on the combination of an integrated Uni-Travelling-Carrier Photodiode (UTC-PD) and a leaky wave antenna. The UTC-PD is a broadband source and we have used an efficient transition from CPW to Planar Goubau Line (PGL). In this PGL section, we have included complementary Split Ring Resonators (c-SRR) in order to obtain a leaky wave antenna (LWA). The broadband behavior of the source and of the transition allow us to design systems at a given frequency range by modifying only the c-SRR along the PGL.

I. INTRODUCTION

SPECIFIC terahertz sources are still a challenging topic for many applications. Among the different room-temperature compact sources, we have chosen to work with UTC-PD invented by NTT (30 years ago!). These photodiodes are relatively broadband when compared to other optoelectronic or electronic devices. We have also a strong experience in the passive circuits based on Planar Goubau Lines. In this work, we have combined the unique properties of active and passive devices in order to obtain a frequency-range specific source governed by the insertion of complementary-split ring resonators (c-SRR).

II. UTC-PD INTEGRATED LWA AND C-SRR

The UTC-PD can be used quite easily as the source for a planar structure like the CPW. In previous work, we have developed efficient and broadband topologies to excite the Goubau mode along a single metallic strip. We have included periodically localized complementary SRRs along the PGL. For this purpose, we have widened the PGL-section. With this approach, we can design different active systems which have a desired radiation pattern at given frequencies. All the details concerning the dimensions and the radiation patterns will be given during the conference.

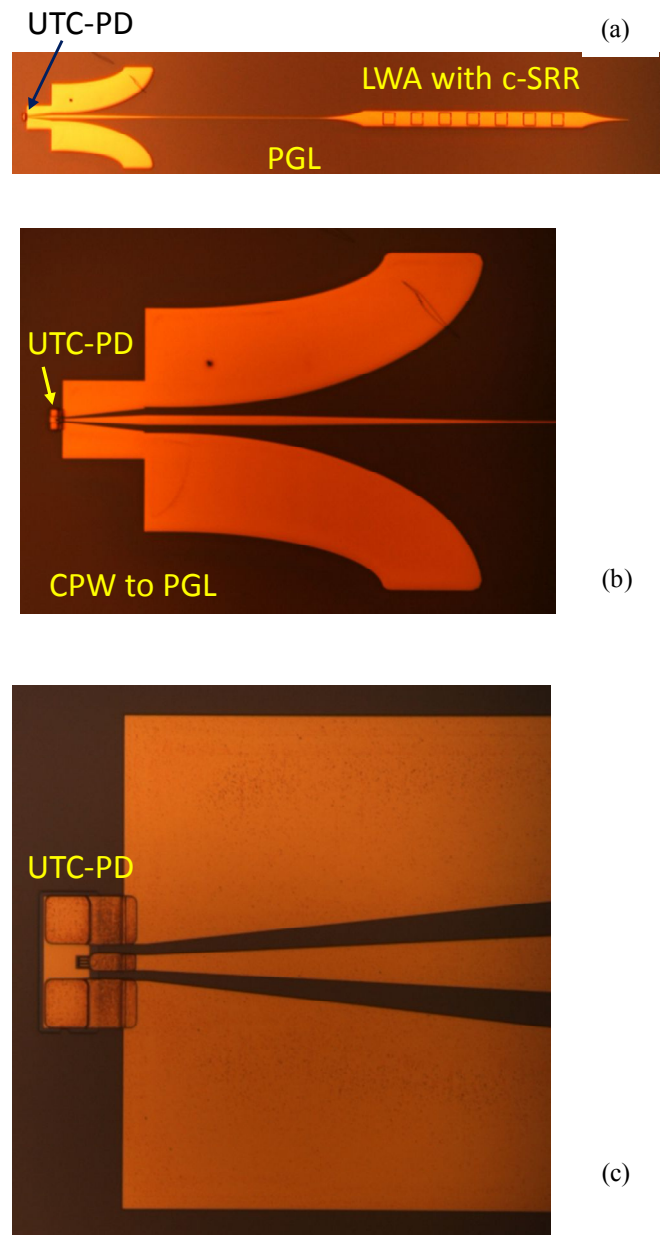


Fig.1 (a) Full structure with the UTC-PD on the left, (b) zoom on the transition section from CPW-to-PGL and (c) zoom on the UTC-PD.

III. ACKNOWLEDGEMENTS

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REFERENCES

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