

### **“Some recent advancements towards effective microwave tomography”**

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**Abstract** – This paper describes a comprehensive microwave tomography strategy which aims at overcoming some difficulties that practically limit use of these techniques in diagnostics applications. First, in order to achieve a simplification of the measurement equipment, we take advantage of an approach to retrieve the scattered field data from the measurement of the square amplitude of the total field. Then, in order to face the ill-posedness and non-linearity of the inverse scattering problem we exploit a preliminary reconstruction of the shape of targets which allows us to reduce the Degree of Non-Linearity of the relationship amongst unknown parameters and scattered fields and to optimize the Contrast Source Extended Born (CS-EB) model. The resulting optimized CS-EB (O-CS-EB) model is used to set a robust inversion strategy to reconstruct the unknown permittivity profile. Results achieved by processing benchmark experimental data show that the proposed strategy is reliable and effective as it achieves accurate reconstructions using amplitude-only narrowband (possibly monochromatic) data.