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Imen ABDENNABI will defend her thesis on October 25, 2023, at 10 a.m. in Polytech Tours, Electronics and Energy Department, at 7 Av. Marcel Dassault, 37200 Tours.

Modelling of carrier lifetime for ultrafast power diodes

Summary:
The dynamic performances of ultrafast recovery diodes are very difficult to predict with Technology Computer-Aided Design (TCAD) simulation tools, especially when the carrier lifetime is adjusted. The standard simulation model used in TCAD tools for carrier lifetime modeling is based on Shockley-Read-Hall (SRH) recombination theory. This model is not sufficient as it considers the presence of only one deep energy level located at the material mid-gap. Used as a carrier lifetime killer, Platinum doping introduces three different deep levels facilitating the minority carrier recombination. Thus, a new approach based on trap physical description is performed using Deep Level Transient Spectroscopy (DLTS) measurement technique and is complemented by capacitance-voltage measurement technique. This approach has significantly reduced the large mismatch observed between the measurement results and the standard simulation model results in the static and the dynamic mode.