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Identification of the defect responsible for current collapse in GaN/AlGaN HEMTs YEVGENIY PUZYREV, XIAO SHEN, SOKRATES PANTELIDES, Vanderbilt University, VANDERBILT PHYSICS TEAM — Recent experiments show that GaN/AlGaN high-electron-mobility transistors (HEMTs) suffer significant current collapse during stress conditions characterized by the presence of charge trap level $\sim$ 0.50 eV below conduction band. This phenomenon has been attributed to thermally activated defect diffusion without specifying responsible defects. Here we report first-principles density-functional calculations of the hydrogenated substitutional oxygen complexes and show that the electric-field-enhanced formation of this defect complex provides an explanation for observed phenomenon.

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