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**Numerical modelling of shading induced degradation in CIGS photovoltaics** SAROJ DAHAL, MARCO NARDONE, Bowling Green State University — The efficiency of thin-film photovoltaic (PV) devices based on copper indium gallium diselenide (CIGS) has increased rapidly over the last few years. Despite lower cost, market penetration is hindered by uncertainty and long-term reliability issues. One important reliability issue for CIGS PV is reverse bias degradation caused by shading. In this work, electrothermal finite element simulation of CIGS modules is employed to study the effects of shading, reverse bias, and material nonuniformities. We observe that thermal runaway can occur at localized spots with lower reverse breakdown voltages relative to the surrounding area. Our calculations are compared to literature data and recent data collected at the National Renewable Energy Lab as part of this project. An important next step is to better understand the anomalous reverse current-voltage characteristics of CIGS devices. Initial efforts to study that phenomenon using semiconductor device simulation is presented.

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