

Abstract Submitted  
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**Temperature Dependence of the Electrostatic Breakdown of Polymeric Insulators**<sup>1</sup> CHARLES SIM, J.R. DENNISON, Utah State University — The temperature dependence of the electrostatic discharge of polymeric insulators has been measured by applying a high voltage across the polymer to induce an electrical breakdown. The breakdown electric field was determined by a rapid rise in I-V curves that were measured in a custom, high vacuum chamber over a temperature range of  $\sim 150$  K to  $\sim 320$  K. Our results showed the electrostatic discharge of the polymer Low Density Polyethylene (LDPE) to be  $318 \pm 60$  ( $\pm 18\%$ ) MV/m with no significant variation over the full temperature range. The results are compared with thermodynamic models of the electric field aging process and limited prior measurements. The motivation for this research was the concern of spacecraft charging and the potential damage from electrostatic breakdown of polymers to be used on the James Webb Space Telescope, which will operate at temperatures down to 30 K.

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Charles Sim  
Utah State University

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