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Hannah Lynne Ball*, USMA PO Box 217, West Point, NY 10997-0217, and **Paul Goethals** and **Vic Trujillo**. *Modeling High Energy Laser Propagation through Rain*. Preliminary report.

High energy lasers have been a subject of interest for the US military for several decades, resulting in the employment of several systems of high energy lasers in use for the Army. Lasers pose a solution to many tactical and strategic problems involving precision destruction of targets and maintaining a technological advantage over enemy forces. Currently, the United States is still developing new laser systems. Previous research has considered the propagation of high energy lasers through clouds, water, and how individual atmospheric conditions impact beam propagation. This research considers the propagation of a new high energy system through complex atmospheric conditions – specifically, propagation through rain. Factors considered include rain, temperature, wind, changing electromagnetic fields, and atmospheric particulates to develop a comprehensive model. The underpinning mathematics are based on a combination of Maxwell’s equations, the Mie solution, and paraxial approximations to Maxwell’s equations as well as previously developed modeling solutions for individual conditions. It is verified on experimental data gathered by the Physics and Nuclear Engineering Department at USMA for the prototype system being examined. (Received January 24, 2022)