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Examining Rotational Ground Motion Induced by Tornados ELIJAH KESSLER, ROBERT DUNN, Hendrix College — Ring lasers are well known for their ability to detect rotation and to serve as replacements for mechanical gyroscopes. The sensitivity of large ring lasers to various forms of ground motion is less familiar. Since ring lasers preferentially measure rotational ground motion and a standard seismograph is designed to measure translational and vertical ground motion, each device responds to different aspects of ground movement. Therefore, the two instruments will be used to explore responses to microseisms, earthquake generated shear waves, and in particular tornado generated ground movement. On April 27, 2014 an EF4 tornado devastated Vilonia, AR a small town ˜21 km from the Hendrix College ring laser. The proximity of the tornado's path to the ring laser interferometer and to a seismograph located in Vilonia provided the opportunity to examine the response of these instruments to tornadic generated ground motion. Our measurements suggest tornadic weather systems can produce both rotational and lateral ground motion. This contention is supported by an after the fact damage survey which found that the tornado flattened a forest in which trees were uprooted and laid down in a pair of converging arcs with the centerline pointed in the direction of the tornado's path.

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