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Large Ring Laser Gyroscopes for Geophysical Measurements[1]
JULIE COATS, ROBERT DUNN[2], Hendrix College — Researchers at the University of Canterbury in Christchurch, New Zealand, the Technical University of Munich in Munich, Germany, and Hendrix College in Conway, Arkansas are engaged in a collaboration using large ring laser gyroscopes to measure geophysical phenomena. This presentation will focus on the contributions of Hendrix College to this collaboration. In an active ring laser gyroscope, coherent waves of light are propagated simultaneously around the laser cavity in both a clockwise and counterclockwise direction. A relatively small amount of light from each of the bi-directional waves is transmitted through the dielectric mirror. At one of the mirrors, the transmitted portions of the bi-directional waves are collimated and combined on a detector. If the laser cavity is rotating, the time for light to complete a path around the cavity depends on its direction of propagation. This difference in transit time creates a beat frequency proportional to the rotation rate. Geophysical effects are observed when they perturb the ring laser and modulate the beat frequency.

[1]National Science Foundation MRI/RUI Grant 0331183, Research Corporation Grant SS0005, Arkansas Space Grant Consortium, and Hendrix College
[2]Professor

Julie Coats
Hendrix College

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