

# The Dime-simeter: A User-friendly Circadian Light Meter

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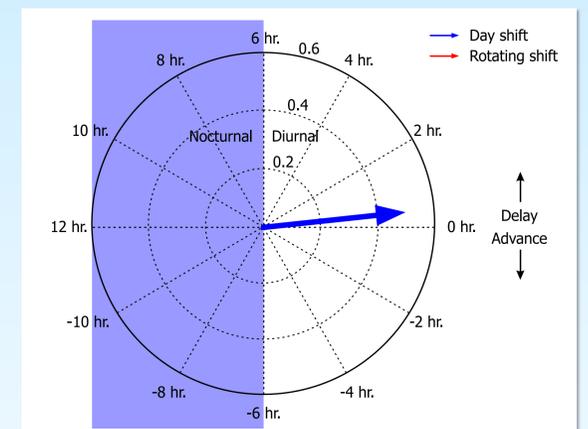
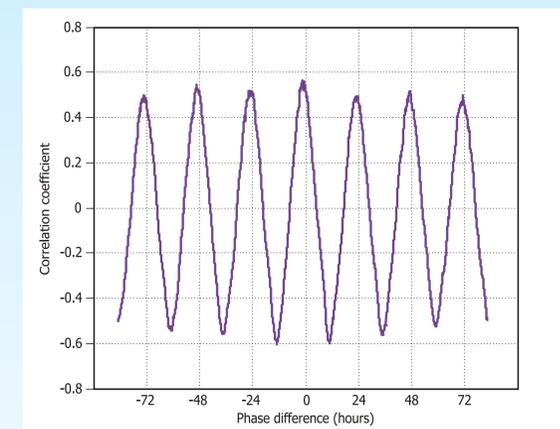
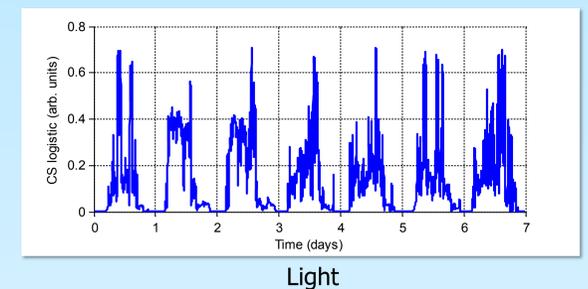
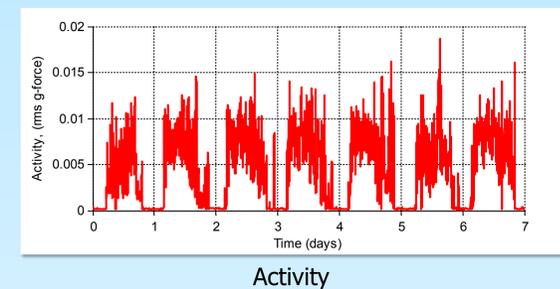
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Sleep disturbances are common in persons with Alzheimer's disease and related dementia (ADRD), resulting in significant negative impact on the patient's daytime function and on the well-being of caregivers. Studies have shown that controlled light treatment can help improve the quality and quantity of sleep in older adults, including those with ADRD. This population would benefit immensely and immediately from a tailored, non-pharmacological light treatment to improve sleep efficiency and consolidation. Current light therapy approaches for reducing sleep disturbances in older adults do not consider the complete 24-hour light-dark pattern they experience, nor do they integrate light (and dark) treatment into a practical delivery system, thus compromising the therapeutic value of light therapy.



The "Dime-simeter" was recently developed by the Lighting Research Center (LRC) at Rensselaer Polytechnic Institute. It is a small dime-sized device that can record circadian light and activity for extended periods of time. Its small size and low mass provide many options for attachment to a person. The Dime-simeter is sealed in cast acrylic for waterproofing and a battery provides power for at least three months while continuously logging data. The Dime-simeter continuously measures both visually and circadian effective light and activity. Data are downloaded via a docking station to be analyzed with a customized Labview program that quantifies circadian disruption.

The LRC recently developed phasor analysis, a novel approach to quantifying the level of circadian disruption experienced by people who wear the Dime-simeter for seven days. Disruption is measured in terms of the asynchrony between the activity-rest pattern and the light-dark pattern.



Circular Correlation Function

Phasor

The Dime-simeter is being used to quantify circadian disruption in persons with ADRD. Baseline measurements of circadian disruption will be obtained from persons with ADRD and from their life-partners. Tailored, 24-hour light schemes will be provided in their homes to determine if light treatment reduces circadian disruption. The Dime-simeter is a compact and sophisticated light and activity measurement device that can be deployed in this population to determine if light therapy can be successfully implemented in a home setting.

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#### Sponsors

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