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**Spectral Analysis of Biodiversity Cycles and Galactic Dynamics**<sup>1</sup> BRUCE LIEBERMAN, ADRIAN MELOTT, University of Kansas — We have analyzed the power spectral and phase relationships of fluctuations in biodiversity, species origination, extinction rate, and motion of the solar system normal to the galactic plane over the last  $\sim 500$  My. The period of the dominant spectral component is the same 62 My for all these except extinction. It is also the same as the rate of gene duplication events (as determined by Ding et al.), suggesting some sort of causal relationship. The spectra suggest that the biodiversity cycle is more closely related to origination rates than extinction rates. Biodiversity and solar motion are offset by  $\pi$ , with gene duplication and origination lagging and leading biodiversity by  $\sim 2$  radians. A picture emerges consistent with a rising rate of mutation and stress on the biosphere as the solar system moves to galactic north, possibly exposed to higher cosmic rays from a galactic bow shock, as proposed elsewhere, and increasing species origination as it returns to the magnetic shielding of the galactic disk.

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Prefer Oral Session  
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