Abstract Submitted
for the FWS16 Meeting of
The American Physical Society

Multivariate Dependence Beyond Shannon Information RYAN JAMES, Univ of California - Davis — Accurately determining dependency structure is critical to discovering a systems causal organization. We recently showed that the transfer entropy fails in a key aspect of thismeasuring information owdue to its conation of dyadic and polyadic relationships. We extend this observation to demonstrate that this is true of all such Shannon information measures when used to analyze multivariate dependencies. This has broad implications, particularly when employing information to express the organization and mechanisms embedded in complex systems. Here, we do not suggest that any aspect of information theory is *wrong*. Rather, the vast majority of its informational measures are simply inadequate for determining the meaningful dependency structure within joint probability distributions. Therefore, such information measures are inadequate for discovering intrinsic causal relations. We close by demonstrating that such distributions exist across an arbitrary set of variables.

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Date submitted: 06 Oct 2016 Electronic form version 1.4